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To explore, enjoy, and preserve the Sierra Nevada and other scenic resources of the United States and its forests, waters, wildlife, and wilderness; to undertake and to publish scientific, literary, and educational studies concerning them; to educate the people with regard to the national and state forests, parks, monuments, and other natural resources of especial scenic beauty and to enlist public interest and coöperation in protecting them.

JOHN MUIR, President 1892 to 1914

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GOING LIGHT — *with Backpack or Burro*

2d printing, 1952

The Sierra Club could hardly ask for more praise for its book than JOSEPH HENRY JACKSON has given it in the *San Francisco Chronicle*:

... a little pocket-size book that contains at least as much in the way of advice, good tips and general common sense on its subject as any volume of comparable size ever printed. That's a pretty large claim, I suppose, but when you stop to note that it is written by ten experts and edited by another, and that it is recommended without reservation by still another, part of whose profession is to be knowledgeable in such matters as our wilderness areas, parks and the like (Newton B. Drury), then perhaps it is not surprising that the book can be mentioned in such extravagant terms.

* * *

There are sections on walking in general, with useful tips on uphill and downhill going; on planning and selecting what to take along; on first aid; on selecting a site and making (and breaking) camp; on cooking, eating and dish-washing. There is counsel on what to do if you are lost, and on how not to get lost, in the first place. Care of the feet? There is advice on this, too. What to wear? Check. Making and carrying the pack? That's here, too.

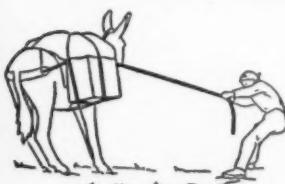
When it comes to how to manage on pack trips with a burro, the advice is just as explicit, even including three pages of clear drawings showing knots, splices and hitches that are useful in loading pack animals. An Appendix offers suggested food lists, and another provides equipment lists, both for the backpackers and animal packers. Finally, there are discussions of how to introduce a wife to the delights of hiking (take it slow-

ly), and of the general question of children on pack trips.

As you see, this is a book of the utmost practicality, written and planned by people who know what they're doing. Editor is David R. Brower. Contributors are Lewis F. Clark, Elizabeth Cowles, Alex Hildebrand, Joel H. Hildebrand, Milton Hildebrand, Mildred Jentsch, Louis H. Klein, Dr. H. Stewart Kimball, Richard M. Leonard and Bestor Robinson. A note tells the reader that the several authors have had from at least ten to nearly sixty years of experience in wilderness travel, and that their experience ranges from the California High Sierra in both summer and winter to Canadian and Alaskan ranges, the Rockies, the Alps and the Himalayas. Four of them assisted in developing mountain training and equipment for the Army in World War II.

* * *

And one other point is worth making. As the editor notes in a foreword, recognized resort areas are growing ever more crowded. But the crowding, he has found, diminishes as the square of the distance from the highway, and as the cube of the elevation above it. That is a useful reminder for anyone who likes his scenery people-free, or near it. I don't know just how the expense diminishes; it would be interesting to have some figures on that. But it's certainly true that the self-sufficient, or almost self-sufficient, hiker gets a lot more of what he wants out of the mountains, and for a lot less.



Going Light—With Backpack or Burro
edited by David R. Brower, xiv + 152 pages, cloth

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Folbots Through Dinosaur

By STEPHEN J. BRADLEY

THE BRIGHT July sun sparkled on the almost unruffled surface of the river. Our last bits of contact with civilization—the Forest Service campground known as Hideout, and a gradually settling pall of dust from our departed vehicles—vanished from sight upstream. Silently we drifted into the beautiful canyon wilderness of the upper Green River, accessible only by boat. There were nine of us, distributed in four boats—two large seven-man rubber life rafts and two folbots (the Americanized name for a collapsible kayak-type craft widely used in Europe for the sport of river running). Our plan was to journey through a little known but reputedly beautiful piece of public-park property, as Dinosaur National Monument.

As complete novices we had sensibly decided not to attempt such a trip without an experienced guide, and Bus Hatch was our skipper. A contractor by profession, Bus is best known for his river achievements. Years ago he and his brother were third and fourth men to successfully run the treacherous Grand Canyon, at a time when disasters outnumbered successes. Now in his late forties, Bus looks like a jolly, ruddy professor on a field trip. Battered felt hat, lopsided bifocals, mischievous blue eyes, abundant friendliness—these give no hint that you are in the presence of one of America's most successful rivermen.

Bus's favorite waters flow through Dinosaur, a place which I until recently had supposed, as many others must have, was little more than an arid, desolate boneyard. The impression might have remained indefinitely but for the limelight of controversy between those who would flood the best part of the monument with two dams and those who are convinced that other damsites will do as well. In a storm of public protest Dinosaur suddenly achieved national recognition. The legend of its two great rivers, the Green and the Yampa, and their magnificent canyons, reached our ears and we were determined to see for ourselves.

Hardly had we drifted three miles before we were convinced that the name Dinosaur is in itself misleading, giving no hint that here is displayed some of the most arrestingly beautiful canyon country in America. Even though U.S. Highway 40 passes within a few miles of its southern boundary, few people penetrate the monument beyond its quarry of ancient fossils and its sweltering little museum. The area is poverty-stricken. Nothing has been spent to make it easy to visit. Access roads leading to several isolated ranches within the canyon territory are little more than improved game trails, long, tortuous, and dusty. Today, the only way to grasp the

full magnitude and magnificence of the Green and Yampa canyons is by boat, an astonishingly easy, comfortable, and at times exciting way at that, dangerous only if attempted without a competent guide.

Noon found us many miles downstream. Were it not for the fact that the shoreline seemed to move by at a rapid rate, we might have felt as though we were suspended in timeless, motionless space, so quiet had been the river. We were passing through a deep, verdant V-cut canyon. Great ledges of red sandstone receded in steps, towering several thousand feet above the canyon floor. A lush growth of spruce, ponderosa pine, and mountain juniper covered the walls. Here and there aspens shimmered in the sunlight, yellow-green patches of brilliant contrast. We sighted deer along the shore and we were constantly startling wild geese, whose young, still unable to fly, would flap noisily downstream ahead of us. The river, far from its source in the Wind River Mountains, was large and murky, packed with latent power. It was winding restlessly through deep twisting canyons, seeking but not finding a way through the Uinta Range barrier to the Colorado. Unable to penetrate the barrier, the Green moves east, quietly traverses Brown's Park, veers abruptly south, and enters the monument down through Lodore Canyon, a thundering twenty miles of wild, spectacular chasm—past Disaster Falls, Triplet Falls, and Hell's Half Mile—then flows placidly into Echo Park to join the Yampa.

We were headed first for Brown's Park; the first two days of our trip would not be in the monument at all and, according to Bus, we would encounter only two major rapids—Ashley Falls and Red Creek Rapids. Bus had no confidence yet in our "kayaks" and we ourselves were in no hurry. The Green did the work while we lazily drifted along, enthralled by the untouched beauty about us. The river began to drop in easy steps, each a long pool, quiet and glassy, leading to a slick tongue of faster water where we always had the sensation of a sudden drop in river elevation. The tongue would invariably break up into a rash of waves, exciting but not dangerous; after the waves, another quiet pool. So go the entire sixty miles of the Upper Green, except for those two rapids.

Ashley Falls is a short foaming cauldron of turbulent water. Bus brought his big craft through and his son Don followed in the second rubber boat. Anne and I decided to chance it with a folbot, something no one had yet done. Of our brief journey through I have but one vivid memory—the sudden appearance of an immense wall of green water, that stationary wave in front of a big churning hole caused by a submerged boulder. In one instant we were solidly immersed in the towering wall. The supple folbot shuddered from the driving impact. In another instant the wave

was gone. Our speed had carried us out into the back eddy and beyond into the quiet water where Bus was standing by to retrieve us in case we had capsized. Dave and Joan Stacey, friends from Boulder, brought the other folbot through, emerging water-soaked but victorious. All of us, including Bus, were favorably impressed with the folbot's driving speed and its unexpected stability.

That evening, around a fragrant campfire of juniper, we talked about Lodore Canyon, which we had decided to by-pass in favor of running part of the Yampa. "There's nothing in the Lodore you can't line your boats around," said Bus; "you might spend most of your time doing that and it really isn't much fun . . . We'll have a go at Red Creek Rapids tomorrow." A sly twinkle lit his eyes. "Red Creek is a pretty good one; might get wet there."

Next morning the Green seemed to drop more rapidly, the canyon walls to get closer together and steeper. The waves became higher, too; but our supple boats knifed through effortlessly. Their extreme flexibility gave us the sensation of being a part of the water itself. There were the usual quiet passages, of course. During one of these, as we drifted silently, our reverie was shattered by Bus. "See that!" he shouted, pointing toward shore. We looked, expecting to see wildlife. Instead we saw a faded surveyor's flag, flapping in the breeze on a tripod high above the river. "That," he said, "marks the Ashley damsite."

Here in the deep canyon country of the upper Green, the harbinger of mechanized progress. Here at Flaming Gorge would be lodged one of five proposed structures, all close together. Three of them—this one, Cross Mountain on the Yampa, and Gray Canyon on the lower Green—would be near the monument. Echo Park and Split Mountain would be in.

"You know," Bus added, "they say that Echo Park Dam will back up water almost to here."

"You mean Lodore Canyon will be just a lake?" I asked.

"Just a lake."

It seemed incredible, but then these dam builders know their business. The West, I mused, is going to become a land of artificial finger lakes. I could see my grandchildren, with their dollar or two of recreation money left after taxes, having to go to a natural-history museum to learn what a river canyon used to be like. But my apprehension about progress and its costs quickly faded, for Bus called out, "Not far to Red Creek now."

Almost immediately we began to pick up a new sound. A faint muffled roar at first, it grew in intensity as we drifted downstream. We could see nothing but the reverberation from the canyon walls told us that there

was violence ahead. Following Bus, we paddled in to shore and from a cliff several hundred feet above the river looked down into a roaring chaos of cascading water, infested with submerged rocks and churning holes—a beautiful, fearsome sight.

Bus led us through on a lightning-fast course, straight and free of rocks. There were three enormous green waves to contend with at the end of the first slick tongue. I can still see Anne sitting in the bow, silhouetted against a murky green wall that seemed to blot out everything but the sky. For a moment she seemed poised in front of it, paddles held high. Then she smashed into it, disappearing from sight. In the next instant I was engulfed and in the next we were both in the trough facing the second wave. We exploded through three in all. With our spray covers closed we took on less than a quart of water. The rest of Red Creek was quieter—many smaller waves, a few easily avoided rocks, and a lot of safe fast water.

As the afternoon progressed the canyon walls seemed to recede, the river to become more placid. The quiet of the wilderness was punctuated from time to time by the heavy splash of someone plunging overboard for a swim. By late afternoon we drifted into Brown's Park, where a truck was waiting to take us around the monument into the Yampa Canyon country.

IN THE ALPINE meadows above Steamboat Springs the Yampa begins. It meanders through prosperous ranch land, wanders beside Highway 40, then disappears to the northwest into semiarid plateau country, giving no hint of what is in store for anyone wishing to follow its course. For a brief moment, Bus told us, it springs to violent life where it pours through Cross Mountain, a narrow gorge three miles long—he tried to run this stretch once but has never been tempted to try it again—then it placidly meanders through Lily Park and quietly enters the Monument. For the next fifty miles the Yampa has carved an enchanting canyon in solid sandstone. Once a passive stream, it was trapped in its serpentine-meander pattern as the land around it slowly rose. Today it is one of the most remarkable examples of entrenched river action in America. In some places the walls actually overhang the river so far that a man standing on the brink, two thousand feet above, who dropped a stone would see it fall upon the opposite bank—undercutting on an epic scale. The great sandstone corridors reminded me of Zion National Park, except that the twisting Yampa Canyon, seen from river level, is much more impressive in its beauty and has a large river flowing in it.

Along the banks the vibrant green box elders stood in bright contrast to the flesh-colored walls as we drifted through an immense cathedral-like

canyon on a river so quiet it was difficult to imagine how it could have cut so deep. The thought of putting any part of this amazing canyon under water is almost sickening when you float down through it. I tried to picture it as a deep lake, six hundred feet deep at Echo Park, extending almost to the eastern limits of the monument. I had to admit that as a lake it would in its unnatural way be beautiful and that it would provide recreational advantages. But the West is already full of artificial lakes and there will be hundreds more, all slightly different, all lovely, but all artificial. Where, I wondered, should we ever find another piece of museum geology to compare with the Yampa's once its canyon becomes just another reservoir?

Back at Mantle Ranch we had persuaded Dr. Stearns, president of the University of Colorado, and Mrs. Stearns to go with us the twelve miles down to Echo Park, into which we now floated silently in the half light surviving a receding thunderstorm. Dr. Stearns was in the region to inspect some ancient Indian cliff dwellings being uncovered by the university. There was a sense of urgency about the word, for Echo Park Dam would submerge these remains as well as others not yet fully explored and perhaps some still undiscovered.

Now Steamboat Rock loomed ahead, immense, ready to apply full power to its turbines. Two eagles were soaring along its top edge, putting on a demonstration of aerial acrobatics that seemed to delight them as much as it did us. In a sheltered grove of box elders across from Steamboat we made camp. Behind us a vertical wall of sandstone rose almost uninterrupted well over a thousand feet. Its face and Steamboat Rock's are the two sounding boards for which Echo Park is named.

"You know," said Dr. Stearns, "when you turn in tonight if you have someone shout 'Time to get up' you can wake up early tomorrow morning with the sound still bouncing between these walls."

Several miles below Echo Park we stopped at a crystal spring to replenish our drinking-water supply and to gather some watercress, which we were nibbling as we drifted into Whirlpool Canyon, a quiet, deep, lovely canyon. Its walls were dark maroon, narrow, and slightly undercut for perhaps five hundred feet, above which the usual multicolored sandstone ledges, dotted with juniper, receded in steps for another thousand feet. Lower in the Canyon we came upon a series of crude ladders which scaled the cliffs, ladders dwarfed by the immensity of the walls. This was the Echo Park damsite. Bus pointed to a white spot high on one wall which looked like a small mine dump. "That's where the top of the dam will be." I could hardly believe it. Almost as high as Hoover Dam, this one would

rise vertically nearly seven hundred feet above our position on the river. Whirlpool Canyon would be well under water. Steamboat Rock would be two-thirds submerged. Lodore Canyon's sounds of living, cascading water would yield to the roar of power boats exploring the unburied remains of a once unbelievable canyon.

It seemed incredible to me that anyone could propose the construction of Echo Park Dam as long as he knew and appreciated the unique beauty which the dam would forever seal from view. To propose to build such a dam within the borders of one of our junior national parks seemed dangerous at best. But to plan five dams, three of them outside the monument, and then to insist that Echo Park should be built first, when still other dams could be built outside the monument at less cost, yet store more water and generate more power—that seemed to defy all logic.

Certainly, I thought, as Whirlpool Canyon receded in the distance, this tremendous project ought to be able to get along, for a while at least, without Echo Park and Split Mountain dams. Perhaps some day Echo will have to go in. If it must, it must, but let's be dead certain of the need—let's not theorize on paper, confused by a lot of nine-digit figures, but judge on the performance of the other dams outside the monument—before we make a possibly tragic error. Drifting along in the brilliant morning sunshine I felt that such a request seemed reasonable. It still does.

SPILT MOUNTAIN was no more than a name until we entered its canyon on the following day, our last on the river. The lower Green, still cutting into the Uinta Plateau, is generally fast, but above Split Mountain we encountered nothing dangerous for our folbots. Some distance below Whirlpool Canyon we emerged from the wild canyon country into Rainbow Park, where for several miles the Green is almost without motion. To the west we could see a low saddle, soft sandstone hills through which the Green might easily have cut a course. To the west, towering above us, ran the rugged continuation of the ramparts. Characteristically unpredictable, the Green veers sharply to the east and slips silently through a narrow vertical slot, right into the heart of Split Mountain, a torn, twisted, deeply inscribed extension of the plateau.

In many ways Split Mountain was a fitting climax to our journey. Geologically it is a crescendo and a finale at the southern limit of the monument. Beyond it there is nothing—flat, desolate desert wasteland for many miles. Its interior is a remarkably wild, splendid canyon, narrow and deep, rich in color. In it we encountered the toughest rapids of the trip. One of these, strangely unnamed, was so treacherously studded with submerged

boulders and deep holes that we immediately declined any temptation to take the folbots through. Instead, we lined them around—put them on leash and walked them around along the shore. It was the only place in our trip where this seemed necessary.

Bus, however, believed that the big boats could make it, although they might fill up with water in the process. He began a careful study of the water, hurling logs into the current to test its direction and velocity. The rapids here were complicated by a long S-curve in the stream and the currents were tricky indeed. The power of the sweeping water made it imperative that the boats should be correctly lined up and on course well in advance—not easy by any means. The log throwing gave good clues.

Here Bus became the real river boatman. The transformation was not noticeable until he moved out into the stream. He had plotted a course two-thirds of the way across the rapids, too far to test with floating logs. It was a hairline route between the boiling holes. He ran it with consummate skill, except that near the end he was carried off course. The big rubber boat dropped into the center of a churning hole. For an eternity it seemed suspended, almost on end, completely at the mercy of the powerful back eddy. Bus lowered his oars and dug in on the fast current running along the outside. For a minute the boat crept back toward the head of the hole, where it surely would fill with water. Then slowly it moved back out into the main current again, safe.

Meanwhile Don was studying a course on the near side. By throwing in logs he had discovered a seemingly possible route between the holes, one that would theoretically miss all of them. It looked possible, however, only if the boat were precisely on course. Log after log went into the cauldron. Satisfied that it could be done, Bus went upstream to skipper the second rubber boat through. It was a marvel to watch. The ponderous craft slid snakelike between the thundering holes without taking on a drop of water. We cheered until we were hoarse.

It was an exciting last day on the river. The water tumbled rapidly from pool to pool. By deliberately staying in the center of the stream we ran into the biggest waves. High and spaced far apart, these waves were always a thrilling roller-coaster series, not dangerous, and invariably followed by a long quiet section. We could have stayed close to shore at any time without encountering waves, but we would have missed the most exciting fast water of our journey. We were busy that last day, not always too busy to notice the primitive beauty of the canyon, but still not free to drift leisurely as we had on the Yampa. Thus we did not know exactly where or when we passed the Split Mountain damsite.

Finally the last rapids came—a speedy route between two rocks, seven or eight immense waves—and we drifted through a narrow keyhole and out into open country, Split Mountain behind us. On shore ahead we saw our automobiles and a friendly delegation of greeters.

THE LEGEND had become a thrilling reality. Seen from its rivers, Dinosaur National Monument is a rare piece of public park, a natural treasure to be zealously guarded and, if possible, preserved essentially as it is. It should be made more accessible, of course. Some of our parks are seen entirely from roads; some from roads to a certain point and by trail from there. Dinosaur is one of the very few where travel by river can be the most pleasant and inspiring way to view the wonders. By careful planning, the monument can be made accessible by road and river—even for complete greenhorns with competent guide. About eighty per cent of the water in the monument is relatively quiet, even though some of it moves along at a pretty rapid rate. Except for Lodore Canyon and Split Mountain Canyon there is really nothing to be feared. One of the most spectacular and beautiful trips would be down the full length of the passive Yampa from Lily Park to Echo Park. Park Service tours with licensed river guides could provide any kind of trip a party might want.

The present inaccessibility of the fund-starved park is no argument that it has no particular value as a park area. And converting its canyons into two great storage tanks would not, in itself, make them more accessible. The expenditure of \$18,000,000 (about half the annual budget of the Park Service) has been budgeted to make Dinosaur accessible *after* the dams go in (subtle persuasion to accept the whole dam proposal?). If only a small part of this sum were spent now to make the area available to the public, I dare say that public interest and use would equal or exceed that in Zion and Bryce. It is my own opinion that Dinosaur merits immediate elevation to full national-park status. And if we can persuade the dam builders to alter their schedule and put in the Ashley and Cross Mountain dams first, the Green and Yampa, now murky and silt-laden, will flow through the park clear and blue, a haven for game fish.

As for future generations, I hope we can pass this area on to them essentially as it is, natural, undisturbed, and spectacular. The American people should have the opportunity to see and evaluate this park property before being forced into a staggering, irrevocable decision they may regret forever.

The Himalaya Since the War

By ALFRED W. BAXTER, JR., FRITZ LIPPmann, ALLEN P. STECK,
and LAWRENCE SWAN*

I. INTRODUCTION: THE LEGACY OF THE 'THIRTIES

DECades before Whymper's fateful ascent of the Matterhorn, many European parties had already traveled to the far reaches of the great Himalayan mountain system. This great backbone of Asia, stretching from Burma to Afghanistan, had excited the curiosity of men in whom scientific interest was combined with a love for mountaineering and exploration. Sikkim, Garhwal, Nepal, Tibet, and the remote Karakoram were all visited prior to 1865, and though few peaks over 20,000 feet were climbed, a pattern was set for the guidance of future expeditions.

Between 1880 and 1900, sixteen expeditions, eight of them directed toward the Karakoram, explored the Himalayan ranges. Younghusband, Conway, Mummery, Freshfield, and the Workmans added their names to the expanding list of Himalayan explorers. Strange and fascinating names, such as Nanda Devi, the Baltoro and Hispar glaciers, Nanga Parbat, Kangchenjunga, and the mysterious K2, began to appear on maps and in the literature.

In 1909, the Duke of Abruzzi, with guides from Courmayeur, explored the approaches to the world's second highest mountain, K2 in the Karakoram, and reached a height of 21,650 feet on the peak. The party set a new altitude record of 24,600 feet on the neighboring Bride Peak. Vittorio Sella was a member of this expedition, and his photographs, even today, remain the finest record of the gigantic stature and beauty of the Karakoram.

Physical exploration was the principal object of these early expeditions. Huge areas were unknown. Entire glacial systems were to be discovered and mapped. The explorers crossed some of the high passes, attempted many formidable peaks and climbed a few. Longstaff's ascent of Trisul in 1907 is usually regarded as the first summit over 7,000 meters (22,967 feet) to be reached. The party made the climb from a 17,000-foot camp, 6,000 feet short of the summit's snow crystals. Rush tactics have not proved possible on the higher giants of the range.

Gradually, as mountain areas became better known, expeditions left

*This article is offered as a selective summary of recent literature concerning the Himalaya; no claims are made to originality. Our thanks are due to Mr. Francis Farquhar for his help in obtaining unpublished maps and material and certain uncommon periodicals.

for the Himalaya with definite climbing objectives. For many parties, exploration became a necessary but secondary activity, designed to facilitate approach to a mountain and to aid in selecting a practical climbing route to its summit. In 1921, the long struggle for Everest began. In this series of concentrated assaults on the world's highest summit, no climber has reached over 28,100 feet and returned, though a number of men have gained this so-called "invisible" altitude barrier: Norton in 1924, and Wager, Wyn Harris, and Smythe in 1933. Even the use of oxygen ("English air" to the native porters) to increase physiological efficiency above 26,000 feet has failed to enable climbers to scale the difficult, final thousand feet on Everest. Several of the other thirteen peaks over 8,000 meters (26,248 feet) were the scenes of major mountaineering efforts. In the 'thirties, the pace of Himalayan exploration increased significantly. Between 1929 and 1939, there were seventy-two, well organized expeditions into various sections of the range, six fewer than for the entire period between 1818 and 1928.

Himalayan climbing in the 'thirties had an international character. British parties made the attempts on Mount Everest in 1933, 1935 (a reconnaissance), 1936, and 1938. The Germans tried Kangchenjunga twice and Nanga Parbat five times. The French Alpine Club sponsored an attempt on Hidden Peak in the Karakoram in 1936. A strong Japanese group climbed Nanda Kot (22,530) in 1936. Two Italian parties visited the Karakoram, and a Polish team climbed the East Peak of Nanda Devi in 1939. American contributions include an attempt on Nanga Parbat with Germans in 1932, the ascent of Nanda Devi with British in 1936, a very successful reconnaissance led by Charles Houston on K2 (28,250) in 1938, and Fritz Wiessner's climb to within 800 feet of that summit in 1939.

The experience gained from these major expeditions makes it almost certain that man, unaided by oxygen, can climb to 29,000 feet. It is known, however, that the chances of any given climber's being fit to climb at extreme altitudes are quite small. Individual physiological differences are extreme, and the most able climber at Alpine heights may be absolutely unfit to go above 21,000 feet. The men who do the best at altitude are those with previous high-altitude experience, but even among them, the problem of promoting acclimatization and minimizing deterioration remains to be solved.

Although a peak above the magic height of 8,000 meters (26,248 feet) had yet to be climbed, men had been higher on both Everest and K2. The record for the highest summit attained increased from Kamet (25,443),

ascended in 1931 by a party including F. S. Smythe and E. E. Shipton, to the 25,645-foot summit of Nanda Devi, reached by N. E. Odell and H. W. Tilman of the Anglo-American party in 1936. This was the highest summit conquered prior to the war. The assault itself was unique in that it was carried through without the aid of native porters on the mountain itself.

The successful ascent of Nanda Devi brought the small expeditions into prominence. Large expeditions, modeled after those attempting Everest, have had as many as fourteen Europeans with several hundred porters. On the other hand, successful climbing and exploration have been effected by as few as two Europeans and three native porters. While small parties, with Shipton's and Tilman's the outstanding examples, have accomplished much in the way of exploration, mapping, and travel in mild and unknown regions, no major peak, to arbitrarily define "major" as more than 24,000 feet, has been successfully ascended by an extremely small party nor is one likely to be. The desirable approach would seem to be to keep the number in the party to the minimum required for the task, thus assuring each member of his worth to the success of the expedition.

The increase in the number of large expeditions to the Himalaya has brought about harmful effects on local populations. Heavy demand for porters can result in the neglect of agriculture and the local inhabitants may be induced to sell precious food reserves. Rupees are as indigestible as other monies, and starvation is the peril to be avoided. The use of air drops may be a solution. One air drop has been made on a major peak in the Himalaya—by the Germans on Nanga Parbat in 1938, at Camp IV (20,340). Many of the difficulties associated with the management of battalions of porters through miles of difficult country could be eliminated in some expeditions, given the adaptation of Alaskan air-drop techniques to favorable terrain in the Himalaya. This is a problem for the future. Ethical questions, as its cost, may be cited as objections to air supply.

II. POLITICAL DEVELOPMENTS

IN ASIA, the social unrest of a century has reached a climax in the political changes of the last four years. The Himalaya has felt the full force of a new era, and the great mountains stand in an altered setting between new countries. Isolated villages and remote valleys have responded to the transformation.

The sequence of events which have changed the Himalaya was initiated on August 15, 1947, with the independence of India and Pakistan. This

was the culmination of colonial peoples' demand for *Swaraj* (self-government), highlighted by the great Sepoy Rebellion of 1857, which resulted in the end of British rule through the British East India Company and transferred British rule to agents of the Crown in 1858, and by the inspired leadership of Mohandas Gandhi, who advocated nonviolent non-coöperation. Independence was not attained without bloodshed and the uprooting of millions of people. The states of Kashmir and Jammu became centers of dispute between religiously hostile factions. With the arrival of the United Nations Commission, the actual fighting diminished, but tension has remained, and travel has been suspended in many areas, particularly in the north along the routes to Nanga Parbat and the Karakoram. Nor has Kangra, now in East Punjab, been aloof from the turmoil of communal bitterness which followed the splitting of India. Economic, as well as political changes, have restricted Himalayan travel in many areas. Porters' wages and the cost of food have risen sharply. Where twelve annas, or a rupee, may have sufficed in 1939, a day's wages for a porter may now range from three to five rupees (at about 25¢ each).

The independence of India inaugurated an expanded relationship between Nepal and the outside world. The Himalayan kingdom, which previously relied on Britain for management of foreign affairs, was now free to open its own doors to well-recommended expeditions. The political consciousness, so evident in India, penetrated into Nepal, and there it developed considerable agitation directed toward the creation of a more representative type of government. The Government of India, cognizant of affairs to the north of Nepal, was anxious to accomplish what it could in the way of strengthening and stabilizing its northern frontiers. In the wake of an uprising in November 1950, India made recommendations to Nepal suggesting a series of democratic reforms with which the Nepalese Government was in accord; however, political strife in Nepal has continued and it is not unlikely that further disturbances will occur. The attitude of the Nepalese Government toward expeditions is of major interest to mountaineers, for of the world's thirteen peaks exceeding 8,000 meters, six lie in Nepal and those six include Everest. At present the government has become concerned about the impact of the many recent expeditions and further permissions are not being granted.

In August 1949 the Indian Government signed a treaty of "peace and perpetual friendship" with Bhutan. No expedition has yet attempted entry into this strange and isolated kingdom wedged between India and Tibet. A result of the new interest in this land might be modification of previous policies of exclusion. It may not be long before the high mountain ranges,

peopled by the wild Bhutanese hill tribes, are accessible. A start in this direction was made by air-rescue teams during World War II.

In October 1950 units of the Chinese People's Army advanced into Tibet. A few skirmishes were fought, and the Dalai Lama fled to the Indian border. As negotiations began, the Dalai Lama returned to Lhasa, and the unique autonomy exercised by Tibet for the last half century came to an end under Sino-Russian hegemony. Access to Tibet, dependent upon the whims of chance and upon pressure by the British foreign office from the time of Younghusband's march to Lhasa in 1903, is now complicated by more pessimistic factors. The Himalaya, however, has been opened to climbing expeditions from the Chinese People's Republic and the Soviet Union, and it is known that strong parties from these countries will attempt Mount Everest and other peaks on the Tibetan border.

III. MOUNTAINEERING SINCE THE WAR

SEEN AGAINST the background of complex political changes, mountaineering since the war exhibits an amazing vitality. In the first few years several small British parties, organized by men on leave from the services, penetrated many of the lesser known ranges and provided valuable geographical data as well as making competent attempts on many of the larger peaks. The extensive reconnaissance of Saser Kangri (25,170) in the eastern Karakoram by J. O. M. Roberts' party in 1946 is typical of these efforts. In 1948, a Swiss party to Garhwal led by André Roch made several fine climbs in the Gangotri area. (Compare Chart B.)

The outstanding postwar ascent has been that of Annapurna (8,078 meters, or 26,504 feet), in Nepal, by a well-organized French expedition. After a careful survey of routes on Dhaulagiri (26,810), the expedition decided against trying this peak and in favor of attempting Annapurna. The summit was reached in June 1950, following an unusually rapid establishment of high camps deemed necessary in the race with the monsoon. Herzog, the leader of the expedition, and Lachenal reached the summit in storm. A series of mishaps forced the climbers to bivouac twice on the descent. Only great endurance and fortunate aid from the other members of the party averted fatal exposure. As it was, the climbers suffered the loss of toes, feet, and fingers from frostbite. With the success on Annapurna, mountaineering has taken another stride toward the summit of Everest. The first eight-thousander has fallen.

A six-man party led by Eric Shipton explored the approaches to the South Col of Mount Everest in the fall (postmonsoon) of 1951. From available reports, it can be said that a route exists up the Khumbu Glacier

into the West Cwm (Welsh, *cirque*), although it is known that a steep, tangled icefall at its base will offer some troubles to loaded porters. From the West Cwm, the way to the South Col (between Everest and Lhotse) appears to be relatively free from difficulty. The col is well over 25,000 feet high. After much difficulty with fresh snow on the Khumbu Glacier, Shipton's party reached the head of the crucial icefall but could not enter the West Cwm owing to a huge, transverse crevasse which stretched from one side of the glacier to the other. The difficulty with this approach to Everest will be the problem and hazard of relaying supplies through the icefall to permit an attempt up to the col and the final south ridge. A Swiss expedition, under the sponsorship of the Swiss Foundation for Alpine Research, was repulsed on this route in the early summer of 1952.

A noteworthy 1950 ascent was that of Tirich Mir (25,263 feet), in Chitral, by a Norwegian party led by Arne Naess; culminating a reconnaissance the previous year, four climbers reached the summit. Mukut Parbat (23,760 feet), in the Kamet group, Garhwal, was ascended by a party of four New Zealanders in 1951.

Postwar Himalayan mountaineering has already equaled that of the decade prior to the war—with a far better safety record. There have been no disasters such as those on Nanga Parbat in 1934 and 1937. This is not to say that there have been none. Most unfortunate was the loss of Roger Duplat and Gilbert Vignes, of the French expedition which repeated the ascent of Nanda Devi. On June 29, 1951, they tried the two-mile traverse, at an altitude nowhere less than 7,000 meters, from the main summit to the East Peak and were never seen again. Another calamity occurred in the course of an attempt on Nanga Parbat by three Englishmen late in 1950. Two were lost in a storm at 18,000 feet and were never seen again by the third, Richard Marsh, who had been incapacitated by frostbite at base camp.

The challenge of the great Himalaya remains undiminished. Everest is probably accessible from the south, but still unclimbed. Of the other famous Nepalese eight-thousanders, Makalu, Dhaulagiri, and Manaslu have never been attempted, and Cho Oyu has repulsed a British expedition led by Eric Shipton in 1951. With each new peak climbed, more are seen on the distant horizon. With each new area visited, even more remote areas beckon the explorer-mountaineer. Little has been seen of the vast ranges of Nepal. The peaks of the Tibet-Bhutan border are unknown. Each expedition that sets out for the Himalaya has at its command the experience and advice of previous parties. New and better equipment, developed under the stress of military needs, is now available to reduce the

danger of climbing at high altitudes. Individual climbers are no better and no braver than were the men of the 'thirties; however, standards of equipment, technique, and aspiration have all increased. New and dramatic Himalayan chapters will be written.

IV. SCIENCE AND PROGRESS IN THE HIMALAYA

JOSEPH DALTON HOOKER's three-year Himalayan expedition (1847-1849) contributed to the botanical basis for the Darwinian revolution in scientific thought. The volumes based on the expedition were widely circulated, and the Himalaya acquired new prominence among scientists. Although the search for new species and the study of their environment has been carried on by scores of men since Hooker's time, the Himalaya remains one of the least collected areas in the world. The wealth of animal life can, in some measure, be inferred from the fact that Sikkim alone harbors 500 to 600 species of birds. Only 40 species of amphibians and 139 different reptiles have been reported from the Himalaya, many of them confined to small pockets where their range can be measured in yards rather than miles. Himalayan fish have only recently been actively investigated. Insects and other invertebrates are present in such huge quantities that it will be a long time before science becomes well acquainted with the less conspicuous forms. Since collecting has for the most part been concentrated in the foothills, the occasional biologist who accompanies a climbing party can gather ecological data from the remote areas which are of particular value. Since the war, Swiss, British, and Indian biologists have accompanied climbing expeditions. A large American party spent the winter months of 1948-49 collecting birds in the foothills of Nepal.

The study of high-altitude phenomena in the highest mountains of the world has until recently been overlooked. The Indian Government in 1947 allotted a large grant for the establishment of an all-purpose high altitude laboratory, but no word has yet been received about their ultimate choice of site. Research has been proposed in astromony, meteorology, glaciology, geophysics, microbiology, physics, physiology, and high-altitude ecology.

Inasmuch as India is in great need of power to run her new industries, and also owing to the extensive floods which ravage the plains, the Government of India has begun a vast program of dam building. Three large dams are at present under construction in the Himalaya, one of them on the Kosi River, which has sources near Mount Everest. Survey parties of Indian scientists have been sent into the interior above the dams to investigate the resources of the land and to estimate the effect the dam may

have upon the economy of the local inhabitants. Other parties have instituted snow surveys, similar to the Sierra surveys, in various parts of the Himalaya. Reforestation programs are also under way. Redwoods from California have been planted in the Western Himalaya.

Geological investigations and the search for minerals have continued. Oil in Kangra and the Abor Hills and ore deposits in Himachal Pradesh have been reported. A most valuable aerial survey was made by eminent Swiss geologists in a flight over central and northwestern Nepal. A recent bulletin from China states that exploring teams, presumably of geological personnel, are spreading throughout Tibet. No doubt some of these groups will penetrate the northern Himalayan slope.

Anthropological research in the Himalaya has made slow progress. The paleo-mongoloid tribes, the Mishmis, Abors, Daflas, Miris, Akas, Lobas, and many others comprise some of the least known peoples of the earth. They have remained in isolated valleys in the mountains from Nepal to China, and their geographic origin and distribution is as mysterious as the origin and distribution of the reptiles, birds, and insects of the same region. Some tribes not yet known may now be passing out of existence and there are frequent, sometimes authenticated, reports of strange savages and dwarflike people. Into this ethnological frame there must be set the persistent rumors of the Metch Kangmi, variously known as the Yeti, the Sog-pa, the Jungli Admi, the Kung-lu, the Banmanus, or simply, the Abominable Snowman. The critical foreign observer may consider this creature a myth or a high-altitude langur monkey or bear. Yet where birds fly at 25,000 feet, spiders live at 22,000 feet, snow leopards prowl at 20,000 feet, and where odd tribes in secluded corners are the rule rather than the exception, the snow-loving Metch Kangmi is not anomalous. Recent reports suggest he is a fantasy, but in the ideal locale for such an admirable legend, it is unlikely that any such prosaic explanation will be acceptable. It remains for future Himalayan travelers to contribute to the story.

Native Daughter

By HAROLD E. PERRY

THE FIRST TIME I saw Maria Lebrado I was aware of a strange reaction within myself. I was looking at an old, old squaw, wrinkled, shrunken, defiant; a stolid soul burdened with memories which reached back to the antagonism and misunderstanding that existed for so long between her people and pioneer Americans in California. But I thought of a charming, carefree Indian girl, one who laughingly enjoyed the freedom allowed the granddaughter of Chief Tenaya in Ahwahnee, the village which flourished in Yosemite Valley a century and more ago.

It was on the occasion of Maria's return to Yosemite, after an absence of seventy-six years, that I first met her. The day was warm, one of the radiantly clear days so common in summer in the Sierra Nevada. The usual flow of visitors was coursing through the exhibit rooms in the Yosemite Museum where I was on duty. When I was informed that Maria Lebrado was entering the museum, that third day of July became historically significant. The last full-blood Yosemite Indian who was alive when the Valley was discovered in 1851 had come back to her ancestral home.

Some ninety years before that day in 1929, Maria was born in Ahwahnee, the village governed by her grandfather, Tenaya. The mother must have been appreciative of the majestic setting, for she named her daughter To-tu-ya, meaning "Foaming Water." To-tu-ya's childhood joy was destined to have a short life. Before she had reached her teens, rumblings of trouble echoed through the foothills west of Yosemite. The discovery of gold marked the end of Indian sovereignty in central California, for immediately prospectors swarmed to the deposits along the fabulous Mother Lode and rudely brushed aside any natives who were unfortunate enough to stand in their way. Soon the dispossessed Indians grew resentful; their mutterings of discontent finally exploded into violence which thundered against the walls of To-tu-ya's valley. The miners, organizing to meet Indian resistance, implored the Government to remove these trouble makers, and themselves volunteered to perform the task. Friction at last flared into war, and history records the entry into Yosemite Valley by an expeditionary force of prospector-soldiers on March 25, 1851. Three times between 1851 and 1853 the Indians were driven from the Valley.

To-tu-ya's childhood fortunes ebbed and flowed on the tide of this unhappy conflict. Twice she and other members of her village were escorted

to a reservation in the foothills. On two other occasions she fled from Yosemite, once to escape surrender to a military detachment and again to avoid capture and possible death during a brief period of intertribal warfare.

The most tragic experience of the girl in these early years occurred in 1851, soon after the Mariposa Battalion arrived in the Valley. Soldiers had captured three of her uncles, sons of Chief Tenaya, near the base of those rocks which have since been known as the Three Brothers. In an attempt to escape, one of these men—her favorite uncle—was killed. Bitterness and hatred filled the heart of the little girl. Small wonder that she fled at last with a determination never to return to the scene of such desecration. This vow she faithfully kept until that long-delayed visit in the summer of 1929.

While still in her teens, To-tu-ya married a full-blood Yosemite Indian and became the mother of four sons and a daughter. During the next few years all four sons as well as her husband met tragic deaths. In the sorrow of these experiences her resentment continued to rankle.

Later To-tu-ya married a half-breed Mexican miner named Yerdies Lebrado. She made her home a few miles east of Mariposa, close to what is now the All-Year Highway. Maria Lebrado—as she was known thereafter—gave birth to four daughters and her life was full once again.

Although she had been invited repeatedly to visit the valley, Maria steadfastly refused. You can imagine our surprise and delight, therefore, upon learning that she was finally coming home.

After her arrival in the valley, several days passed before Maria responded to an invitation to visit the museum and see what was being done to preserve the story of her people. At first she refused, but later she reconsidered.

Thus on that third of July Maria appeared at the Yosemite Museum. I shall never forget the half hour that followed. Visitors were quickly ushered from the Indian Room so that the sanctity of Maria's experience would not be violated by curious eyes or flippant remarks. Exhibit cases were swung open and everything within them was made accessible to her hungry fingers. She walked slowly from one display to the next. I studied her reactions, and tried to imagine the emotions which were flooding her consciousness. Haunted by a lifelong bitterness yet responsive to a newly awakened urge, Maria seemed to have a rebirth of interest as she viewed the contents of the Indian Room. She was reticent and uncommunicative at first, but the sight of so many familiar things swept her mind back to girlhood days. Enthusiastic now, she began to chatter in a mixture of

Indian, Spanish, and English words. Her delight was unbounded; several times her laughter echoed through the Museum as some exhibit struck a chord of reminiscent pleasure. But in every moment of the short encounter I detected a deep, underlying note of pathos.

When Maria was ready to leave, she noticed the curious tourists who had congregated at the door, and reverted to her old unyielding attitude. She emerged from the Museum with all the dignity and reserve one might associate with the granddaughter of an Indian chief. In a few days Maria left the valley, never to return.

A year later, in August of 1930, I met Maria Lebrero for the second and last time. With my family and the Museum Librarian, I journeyed to her home on Bear Creek. We found the little cabin at the end of a winding dirt road, a mile or so from the highway. Old Mary came out to welcome us—the daughter of Maria's first marriage some seventy years before. Mary announced us to her mother and soon we were all seated at the front step. I could glimpse the interior of the cabin. It was almost bare, but very neat. Several sacks of acorns lined one wall, a backlog of primitive food against a rainy day. Because of language difficulties, our conversation was limited, but we sensed a warmth in Maria's countenance that needed no interpreter.

As we became aware of Maria's interest in our baby and realized her unexpressed longing, we laid him in her arms. She clasped him to her breast and swayed slowly back and forth. Time rolled back for Maria to the days of her own active motherhood and her face was radiant. Then a faraway look came into her eyes. Maria sadly remembered, "All gone, long, long 'go, my all gone." She was an old, old woman again and she complained that her eyes were poor and her teeth were "all gone." We jokingly pointed out that our baby had no teeth either and she laughingly prophesied, "He get some, by 'n' by."

Our visit soon ended and we thanked Maria for her hospitality. As we drove back—to her valley—we felt that in seeing her again we had been privileged and that our lives had been lastingly enriched.

Less than a year later, on April 20, 1931, Maria Lebrero slipped quietly away to "El-o-win," the Far West of the Yosemite Indians. She had requested an Indian funeral. When the time came, tom-toms beat for an hour or more while relatives and friends circled Maria's body as they joined in a funeral dance and song of Chief Tenaya's day. Late in the afternoon the body was placed in a casket. Following the last kiss and the final farewell, the casket was closed. Eight young Indians—grandsons and relatives—led a procession of more than one hundred persons as they

bore the body of Maria Lebrado to its resting place in the family cemetery. With more ceremonial singing and swaying, the casket was lowered into a muslin-lined grave, the sides of which were softened with fern fronds. Articles dear to the dead woman were placed in the grave, and finally it was filled and wildflowers were placed on the mound.

I like to believe that Maria's attitude toward the white race had mellowed during her later years. Long before, with great bitterness in her heart, she had fled the valley with a firm resolution never to return, but finally she did. On her visit to Yosemite she had no intention of going to the Museum, but she did. Above all, she had never permitted anyone to take her picture. Even in that instance, the warmth and understanding of a white woman—the Museum Librarian—melted this resistance and several pictures were made, one of which hangs today in the Indian Room. Perhaps the most convincing proof of Maria's change of heart was manifested at the time of her funeral, for among the cherished possessions laid beside her in the grave was a woolen blanket, a gift to Maria from this same warm-hearted white woman.

Maria Lebrado's physical form will never be seen again, but I find it easy to believe that To-tu-ya's liberated spirit has returned again to the scenes of her childhood—to Yosemite, the home of "Foaming Water."

First Ascents to St. Elias Range

By ALFRED W. BAXTER, JR.

SIGNIFICANT MOUNTAINEERING objectives are becoming increasingly hard to find. In selecting a goal for the summer of 1951, we considered areas that were unexplored, reasonably accessible and supplied with lofty unclimbed peaks. After much consideration, Mount Bear (14,850) just on the Alaskan side of the Alaska-Yukon boundary was chosen as our primary objective.

The party was made up of Rupert Gates, Fritz Lippmann, Jon Lindbergh and myself. Jon was a newcomer to our group, recruited from the freshman class at Stanford. His youth, strength and eagerness were continual assets to the party. Gates, Lippmann, and I met at Stanford in 1946 and since then had climbed together all over the West and on many of the classic Alpine routes.

Our basic plan to drive to Whitehorse via the Alaska Highway in a Ford three-quarter-ton truck moved smoothly until we lost Lippmann to an emergency appendectomy in Dawson Creek, B.C. After frantic calls to friends in the States to recruit an additional team member who could join Fritz on his recovery and meet with us at a predetermined base camp we got a response from Dick McGowan of Seattle.

At Whitehorse, we took residence at the RCAF Base to wait for the C-47 from the AAF base in Fairbanks. This plane and crew from the famous 10th Search and Rescue Squadron, were to air drop the 1600 pounds of supplies and equipment that we had been frantically arranging and packing in a quiet corner of one of the large hangars. Using knowledge gained from the Sierra Club expeditions to the Coast Mountains of British Columbia in 1947 and 1950, we packed supplies in cubic-foot dry-ice cartons and then banded the cardboard loads with steel tape. We were to have only negligible loss from impact damage as a result.

We spent the evening of the 4th of July discussing final plans with the pilot and crew of the aircraft. The next morning [after minor difficulties with the de-icing equipment], we were airborne and headed west, parallel to the great northern ridges of the St. Elias Range. The extra crew members slept or read magazines while we, much less blasé, rushed around taking pictures from the windows and identifying the peaks that filled the skyline to the south.

At last the moraine-covered snout of the Klutlan Glacier came into sight below us and the plane swung due south to follow the windings of the

broad ice stream into the spot where we hoped to drop our supplies and later establish base camp.

The pilot lined up over a prominent moraine, flew a trial pattern while we and the crew got the boxes loaded on to a chute with small rollers leading to the open cargo door. Each time the plane approached a small surface lake and was parallel to the moraine, the pilot would ring a bell and bank the ship so that the loads would slide down the chute. Looking back, we could see the boxes skid and bounce on the snow cover on the glacier. If only a snow storm did not cover the boxes before we could find and recover them, all would be well with the expedition.

By 3:30 our pilot had flown over the flat glacier in the five low passes necessary for the air drop, and we were on our way back down the glacier toward the Canadian weather station and emergency landing field at Snag. Here we landed in time for a high tea with the Canadians, followed by an even higher dinner, and finally a truck ride down the highway to the spot where the road crosses the White River on a modern, steel-span bridge. At this point we took up 80-pound packs and started in the 75 miles to our objective, which had been only 100 vertical feet away four hours before. Our route, for several days, followed the eastern bank of the White River. Some of the way we used the gravel bars left by the shifting channels of the river, more often we were forced up into the muskeg swamps and deadfalls that made up the shelves above the river. On good days we might make as much as seven miles in ten hours; through bad country we might do three or four miles. After six days of strenuous backpacking, we came to the Klutlan River where it rushes out of ice caves well up in the vast moraine fields. With no more river-crossing problems, we were able to gain the west side of the lower Klutlan Glacier, from which we could gain a steep pass and cut off several miles where the glacier makes a right angle bend to the west.

Up and over the pass, steep loose scree on top of stagnant ice, sun temperatures up to 120° in the sun, and big blisters with little blisters slowed our progress. A bad day, all in all, but when it was over we could see up the Klutlan Glacier to the base of our peaks.

After three more days, on the 14th of July, we found the first box of supplies, sitting on the water-scored ice and quite near the medial moraine which served as a guide to the location. The ten-day approach had exceeded our estimates so we were glad to replenish our thoroughly depleted food supply—we were down to a small handful of oatmeal and five cans of pemmican. On July 15, in the perpetual daylight of the northern summer, we unpacked boxes, set up our tents and feasted on our stores of food.

Canned meats of many kinds, rice, soups, spaghetti, powdered potatoes, hot jello, rum, and salty sardines were all welcome relief from our short rations. The next morning we worked setting our house in order and getting ready for our attempt on Mount Bear, which we could see 19 miles and 9,000 feet away at the head of one of the three large tributary glaciers which joined beneath us to form Klutlan.

We first tried dragging our supplies on small toboggans. The rough ice and the complicated pressure ridges and crevasse systems soon made this scheme impracticable. For the rest of the trip we loaded up the packboards and laboriously established the string of camps necessary to gain the summits in safety.

The perpetual sunlight left the snow cover soft and wet between 7,500 and 11,000 feet, where we had most of our horizontal distances. We sank to our knees even with the snowshoes that survived the Sierra Club Waddington Expedition in 1947. Gradually we got our tents and supplies closer to the Mount Bear massif.

Above Camp II spread a vast snow-covered plateau on the glacier. While crossing it, and sinking in—to the thighs as we remember it now—in the soft snow, we encountered three long parallel crevasses stretching perhaps three-quarters of a mile across our route. The first one could be identified by a few breaks in the snow covering which showed up like dark holes on the glaring white surface. The second was less obvious. While easing out on the thin snow roof, I put a foot through. The approved procedure is to sprawl flat to increase the snow area that must bear weight. Lindbergh, who was behind, automatically backed up and maintained a taut rope between us. At the moment when I started to shift my weight to crawl back to the lip, the snow broke all around me and I plunged upside down and backward into the crevasse. The force of the fall pulled Jon forward a few feet; but swift work with the ax plus the friction of the rope running through the soft lip enabled him to hold the fall. Unfortunately my pack straps had ripped loose as I fell and I could see my load wedged far below in a narrow part of the crevasse. I lost one of my snow shoes in the process of getting my feet into the prusik slings kept above the waist loop. These slings enable a man to get the weight off his chest and also allow the climber to climb back out of the crevasse under his own power with whatever tension can be provided from above. In twenty minutes I was back out in the sunshine, wet from the soft snow that had fallen while I chopped through the overhanging lip. Gates had taken the strain from Lindbergh and had supervised rescue operations from the top. In five weeks of glacier travel this was the only time anybody went in over

his head. On many occasions a foot or leg would break through, however.

To recover the lost pack, it was necessary to go all the way back to base camp—ten long miles through soft snow—and get extra rope. Three days later we were back at the sight of the accident and ready for Gates and then Lindbergh to rappel into the crevasse and pry the pack loose from the encrusting ice. A loaf of bread was a bit soggy and a spare sleeping bag got slightly damp, but the necessary clothing, food, and equipment were all salvaged.

Above Camp II a branch glacier which we named Gateway offered an attractive route by-passing the steep icefalls and jagged ridges which descended from the north and northwest slopes of the mountain. Eight days out from Base Camp we established Camp III, a small pyramidal army tent, alone on a flat spot on Gateway Glacier below a 4,000-foot icefall descending from the summit ridge far above us. The next day confirmed the wisdom of our choice of routes. We gained altitude cheaply—with effort, but without serious technical difficulty and with a minimum of objective danger. Camp IV was the same tent placed at 13,000 feet on a plateau between two icefalls on the great north face. From our camp we could see the beautiful Natazhat Range which forms the north wall of the Klutlan. The principal summits were just below us; to our west we could see the twin snow domes of Mount Bona (16,420), and to our east was the 15,880-foot summit of Mount Wood.

The hardest thing to do in the mountains is to get up in the morning. Before the sun hit our tent, on July 27, the cold wind and frozen boots made climbing seem an absurd and miserable way to spend a summer. With breakfast, sunshine, and boots softened over the primus stove, the way above looked more attractive. Leaving the tent set up and placing willow wands every rope length to ensure a route back if a storm should cover our tracks and cut visibility, we started out for the top. Three hours later, shortly after noon, I broke trail to a small dent in the vast summit ridge. All at once the misery of the past days was justified. We called this lofty saddle "Surmise Col." From it we could see the entire St. Elias Range, tangled masses of ice-fluted peaks stretching into the distance with Logan, King Peak, St. Slias, and Bona dominating the view. We had perfect weather; our summit was in sight only three miles away and a few hundred feet higher than our ample lunch spot. The dark tarp soon provided ample meltwater for lemonade to wash down our sardines and salami. With confidence we plodded for two hours, traversing five humps on the ridge so that we should be sure of standing on the highest point. For a whole hour we stood on the flattened summit; handshakes, a second

lunch, photography, and the sketching in of obvious topographic features on the blank map made the time pass quickly. The goal of weeks of effort and months of planning had been achieved and we were really quite happy about the whole thing. Then back down our tracks to the small tent, off with the frozen boots, and into the sacks. (On big peaks one is either climbing or in the sleeping bag.)

The next day saw us past Camp III and all the way off the mountain to Camp II at 8,000 feet on Bear Glacier. We had had perfect weather when we needed it so we did not begrudge a day of light snow and the rest it forced upon us. A check on food revealed a four-day supply. There being little point in carrying food down hill to a well-supplied base camp, we spent three days reconnoitering some smaller peaks above Divide Glacier. The weather held foul so the net result of our efforts was a prolonged view of the inside of a snowstorm and no view of the choice peaks.

Food gone and ambition lowered, we plodded sixteen hours back to Base Camp, arriving late at night in a miserable rain. Jon had a midnight feast of spinach, canned beef, and jello; Bud and I were glad to get tents repitched and start ten hours of sleeping. On the morning of August 2 we were awakened by the roar of motors. Quickly we got out on the ice and looked up at the broken cloud layer to spot the plane. At last sunlight glinted on the wings of a Canadian C-47. We guessed this must be members of the RCAF pararescue section from Whitehorse who had hoped to jump into base camp with additional supplies and join us in further climbing. We were disappointed when the plane made only one high circle above our camp and then disappeared to the east. A louder roar attracted us to an American B-17 from the 10th Rescue Squadron. We learned later that Fritz and Dick McGowan had started in on foot to join us at base camp. Mistaking the footprints around one of our campsites for a sign of a retreat on our part, Lippmann and McGowan, the latter suffering from a severe allergic disorder, returned to the highway and asked that any plane on regular missions near our area be requested to fly over base camp for a check.

When the pilot worked the huge plane down through the cloud cover to make increasingly low passes over our camp we set up smoke flares to mark a drop zone in case a supply of fresh oranges and magazines was forthcoming. We also set up the ground-air panel signal for "all-well"—two L's. The plane was in radio contact with Lippmann at Snag Air Base and he later relayed the news of our safety to our friends at home. We were glad to know that we were not forgotten and felt that the plane was just paying a social call on the way home from a routine mission. We had

no way of knowing about the serious airline accidents that caused the search activity or of Lippman's solicitude from Snag.

On the 6th of August, with Mount Bear and a few days' rest behind us, we started up the northwest branch of the Klutlan Glacier. Our packs contained supplies for eight days; given good weather, we felt confident in getting up a new route on Mount Bona. The summit had previously been gained from the northwest via the Russell Glacier by Terris Moore and Allan Carpé in 1931.

Three days, one storm, and two camps later we were below the east face of Mount Bona. A storm on the first night out from base camp caused us some trouble. At about 2 A.M., during the height of the gale, the center pole of our tent snapped under the violent lashing of the fabric and the force of the gusty wind. All at once we were covered with wet clammy nylon. The next minutes of struggle, to repair and reestablish the tent pole from the dark interior of the wind-battered tent, rank with the lowest moments of the trip. Our language had the effect of turning the air blue, for in the morning our usual good weather had returned.

After a day's rest we made a second camp and estimated our altitude at about 10,000 feet. This meant that we would need at least one more camp to reach the 16,420-foot summit. One long day's climb over sickening snow bridges and through crevasse belts got us and our packs to a windswept slope where a puffing leader could not go fast enough to keep the followers warm.

An incident on this climb was the sudden collapse of a heavy mass of snow covering a crevasse. From our position on a small platform lower down in the sérac belt, the resulting geyser-like blast of snow dust and blocks of ice looked like the advance guard of a sérac avalanche headed our way. It was an anxious moment. More hours of uphill plodding, and the sun dropped behind a ridge; the cold and our fatigue made camping seem attractive. Our altitude was probably more than 14,000 feet. Again in the prolonged twilight we could see the great peaks of the St. Elias touched with alpen glow. Instead of the fleeting pink, red, and purple of lower altitudes, Mount Logan glowed bright red for more than an hour. The view from our cold tent that night was the most impressive any of us had ever seen. In late July we had begun to see faint stars in the twilight sky at midnight. Now, in August, the sky provided a dark background for displays of the Northern Lights, and great sheets of color spread across the Arctic night in changing patterns of brilliance.

The next day dawned clear. We made fair time up the slopes of soft dry snow leading to a plateau almost two miles long that connects the

main summit cone with the smaller and more pointed ridge forming the northern subsummit. By 1 P.M., we were ready for a lunch stop and a rest to exchange snowshoes for crampons. Above us rose the steeper slopes where windslab and the 45° angle required caution both up and down. Three hours later we could get no higher; standing in two feet of powder snow we had gained the season's second summit.

On Bona the additional altitude and a sharp wind made photography a chore, since to operate our cameras we had to remove the gloves and expose sweaty fingers to the cold. After a few peanuts and a bite of snow, we ran back down our tracks to the lunch spot. The 1600 feet which had taken three hours to ascend required only 25 minutes on the descent. At the lunch spot we discarded crampons and put on dry socks. Even when the air temperature was warm, the lower layers of unconsolidated snow remained well below freezing owing to the insulating effect of the more saturated crust, and these underlayers were frequently cold enough to freeze the outermost sock to the inside of the boot.

On the return to high camp (Camp III) my pants had got wet from snow thrown up from poorly adjusted snowshoe bindings. The next morning I held the fort and dried them while Jon and Bud climbed back up the wide tracks to the plateau and over to the 15,600 subsummit. Jon led competently up and down the steep and narrow ridge over the twin summits. They returned in the early afternoon for a feast on our remaining food. By three that afternoon we were ready to strike our highest camp and get back down to the wide glacier 4,000 feet below.

We reached the site of our previous Camp II, climbed in bags, planning to climb to the head of the Klutlan Glacier the next day. Our good weather continued, so after breakfast we walked unladen up the two miles and 1,000 feet to Klutlan Col, which is the low point on the watershed between Mount Bona and Mount Tresidder (14,000). In this area the St. Elias range is in one respect similar to the Sierra. One side has a very gradual slope and the other side is a steep escarpment. We had approached Klutlan Col over the 65-mile-long glacier that flows to the east and north. From the Col we could look down a 4,000 foot cliff to a cirque at the head of an unnamed tributary of the Barnard Glacier which eventually drains into the Chitina River and the Pacific Ocean. The peaks at the head of this cirque all rise at least 6,000 feet and Mount Bona almost 9,000 feet in steep, ice-fluted walls. The cluster of beautiful satellite peaks to the south and west of Bona will certainly offer climbing problems for the coming generation.

A long trek to base camp and two days of rest was followed by a climb

by Gates and Lindbergh on Mount Jordan. We named this peak after the first president of Stanford University, just as we had named other summits after Branner, Wilbur, and Tresidder, who held the office after him.

The climb on Mount Jordan (c. 13,400) was made in a serious storm and was technically the most difficult of the peaks ascended during the summer. There are dozens of attractive peaks like Jordan in the area which would be irresistible if they were not dwarfed by the much loftier peaks on the main divide. Mount Natazhat (13,400) is beautiful from any angle; Mounts John Hood and Rolph Pundt are inspiring wedges adjacent to Natazhat on the west. These and other peaks we hope will draw other climbing parties into this attractive area.

Our trip back to the highway was made over Giffin Pass, used in 1914 by a party from the International Boundary Commission. We were impressed by the terrain over which they had managed to bring pack horses. We found it strenuous on foot.

August 20, two days out from base camp found us near the head of the White River. Here we gathered logs cast up on the gravel bars and constructed a raft to carry us and our gear down the swift glacial river. Raft travel is always exciting; submerged boulders, sand bars, violent cross currents all demand attention. After half a day of this ride we entered the upper canyon of the White River. This gorge has vertical rock walls rising as much as 1,000 feet in some places. The force of the great river has carved a channel with frequent right-angle bends. In each of these the full force of the current hits the cliff, foams and boils off, and then repeats the procedure at the next bend. Since all we could do was paddle with our poles, loud noises up ahead always brought frightening visions of waterfalls, serious rapids, or whirlpools.

In the early evening we were caught in a whirlpool from which we could not regain the main channel. It was necessary to gain the bank, camp, and the next day relay the raft ropes and the supplies up the canyon walls and around to a site where we could construct a new raft for the relatively placid ride down the remaining eighteen miles of water to the bridge. Rafter's-foot, the dreaded numbing of the feet and lower shins from prolonged immersion in icy water is preferable always to bushwacker's-back and swampwalker's-toe, maladies which afflict dry-land travelers in the Yukon bush. Worse than any of these minor ailments, however, is fleshpot-paunch, a rather stuffed feeling which characteristically follows two T-bone steaks, three successive orders of pork chops, waffles, and cheeseburgers, all with pineapple-milkshake chasers.



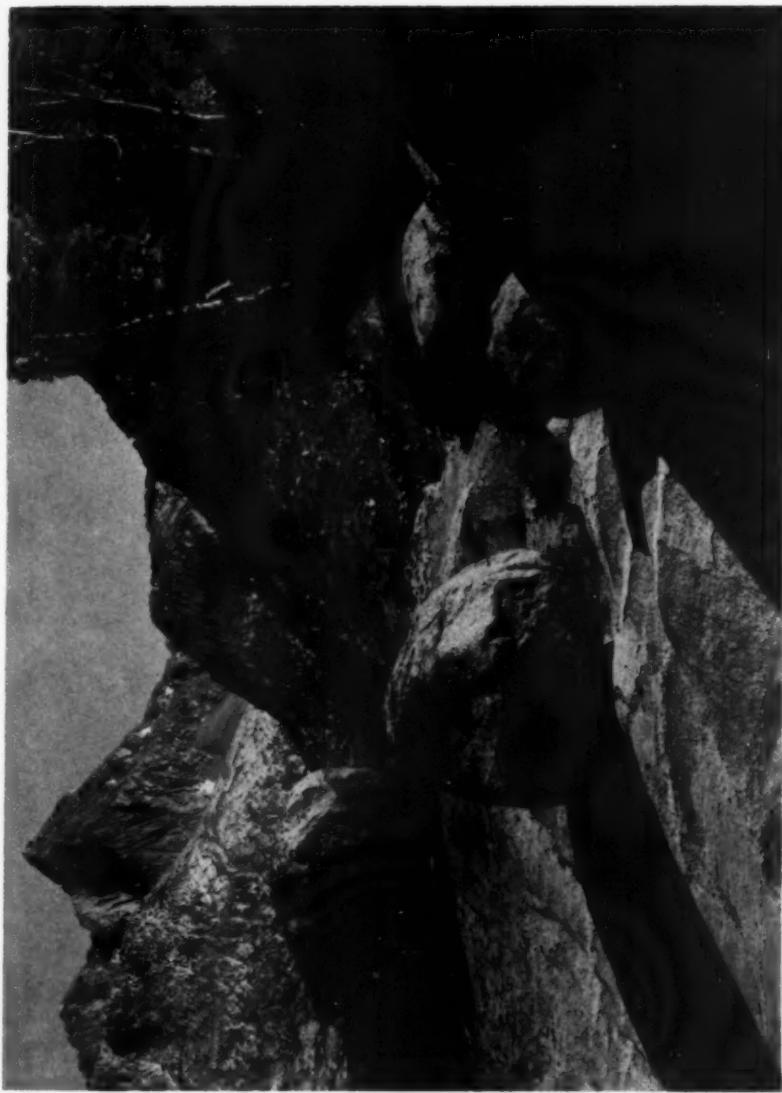
From the Magic Circle, High Sierra

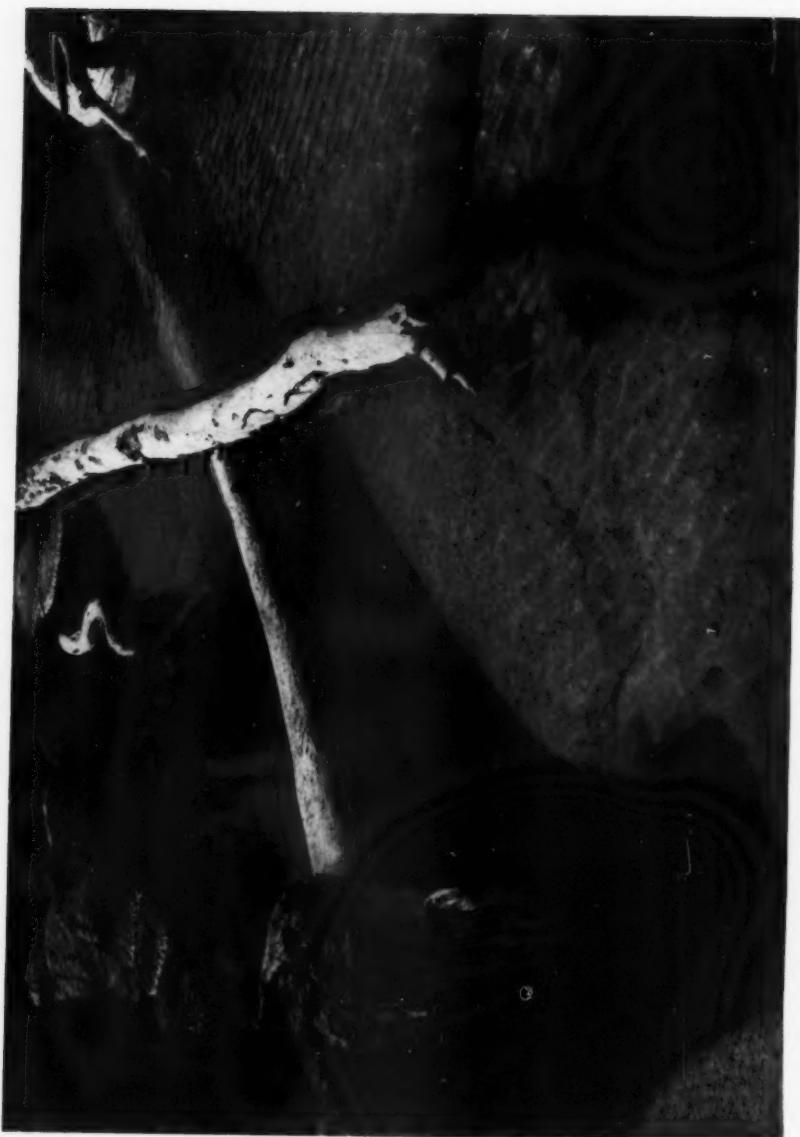
TWELVE PHOTOGRAPHS BY PHILIP HYDE























1. Evolution Creek near outlet of Evolution Lake.
2. Lake above Hutchinson Meadow; Mount Humphreys.
3. Forest floor near Hutchinson Meadow.
4. Evolution Valley; McClure Meadow.
5. Mount Huxley and erratic boulders.
6. Shore of Loch Leven, near Piute Pass.
7. Grass in shallow water.
8. Mount Huxley from Sapphire Lake.
9. Darwin Group, Evolution Lake.
10. Glacier-polished rocks, LeConte Canyon.
11. Dusy Basin; view toward Muir Pass.
12. End of rainstorm, Dusy Basin.

Magnificent Katmai

By LOWELL SUMNER*

1. The Cataclysm

IN THE BROAD and tranquil valley, sheltered from the wild seacoast by a tall, ice-capped mountain, the peaceful centuries had slipped by uncounted. The valley was dotted with ponds, and its upper end was green with shoulder-high grass. Farther down it was clothed densely in a forest of clean-barked birches and cottonwoods, merging into dark green spruce at the lower levels. The mountain, third highest in the area at the base of the Alaska Peninsula and the continental end of the Aleutian Range, was Mount Katmai, a prominent and peaceful landmark.

In the first week of June 1912, Mount Katmai's towering summit was still encased in winter snow, but the lower valleys had begun to turn green with approaching spring. On

the coastal side of the mountain, the cottonwoods were budding in broad Katmai Valley and from the lagoons and beaches there arose an almost continual excited clamor of bird voices as the migrating flocks from the far south returned to their summer homeland. Inland from the mountain the ice was breaking up on the great lakes, bears were stirring from their hibernation dens, and birches and cottonwoods were leafing out as the peaceful wilderness gradually awakened.

An earthquake was the first unusual event to disturb this lonely tranquillity. In the next day or two others followed with increasing frequency and violence, until suddenly the entire face of a small mountain behind Katmai collapsed and slid into the forest with a stupendous roar. Dust billowing up from this monstrous, freshly-opened rock quarry, and from countless avalanches of boulders shaken loose from surrounding peaks, darkened the sky.

The only inhabitants of this entire region were a few natives, who fled in panic from the two small villages of Savonoski in the interior and Katmai on the coast. No one was close enough to observe in detail the

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cataclysm that now followed swiftly, nor could any have done so and lived, but scientists of the National Geographic Society expedition under Dr. Robert F. Griggs, arriving four years after, have reconstructed the story.

As the earthquakes continued, innumerable cracks opened in the heaving floor of the interior valley, through which foaming, molten rock welled up. Quickly it set fire to the wildly swaying trees, and swept hissing into the swamps and lingering snowbanks, converting all moisture and greenery into clouds of mingled steam, dust, and sulfurous smoke which hid the sun and spread over the whole base of the Alaska Peninsula.

Soon the entire valley was flooded with an incandescent emulsion, consisting of droplets and small clots of liquid rock, so heavily surcharged with escaping gas that they were buoyed up, and flowed swiftly in a frothy foam for fifteen miles down the valley, destroying all living things.

At about the same time a small new volcano at the base of the main mountain range, probably originating as a particularly large vent for the frothing eruption of gas and magma, began to shoot dense, red-hot bombs of lava thousands of feet into the air, and to scatter coarse pumice fragments over an area ten to fifteen miles in diameter. This was Novarupta.

From millions of crevices in the cooling magma, which soon began to subside on the completely desolate valley floor, jets of steam and volcanic gases burst forth, at least a thousand of the largest sending their roaring white columns more than five hundred feet into the air. Thus was born the Valley of Ten Thousand Smokes.

But the climax of the eruption was yet to come, for the enormous subterranean pressures which had forced the gas and molten rock up through the valley floor were also at work in the interior of towering Mount Katmai.

At 1:00 p.m. June 6, 1912, the mountain's crest was torn open by the first inconceivably gigantic explosion, which dwarfed all previous phases of the eruption. The contents of the crater billowed up in a mushroom cloud of gas and pulverized rock that bulged into the stratosphere. The blackened sky was lurid with lightning flashes as the pumice fragments hurtled earthward. Then came the first of the great snowstorms of ash that turned two days and three nights into one nearly unbroken period of impenetrable darkness, smothered Katmai Valley, choked the harbors for miles around, blanketed distant Kodiak Island with a foot of fine, loose ash, and spawned a rain of sulfurous acid that irritated the skin and eyes of persons as far as three hundred and sixty miles away.*

* See References at end of article

Almost incredibly, Mount Katmai's foundation was shaken in the next seventy-two hours by three more tremendous explosions of surcharged magma. Then the whole top of the disemboweled mountain, reduced to a thin shell crisscrossed by horrid spreading fissures, collapsed with a thundering roar into the flaming cauldron below.

At last the cataclysmic stage began to wane, although the incandescent interior of the crater was seen reflected redly against the clouds as late as July 21, and the dust from the eruption formed a thin haze that lingered over half the world that summer and measurably lowered the earth's temperature not only in North America but also in Europe, Asia, and northern Africa.

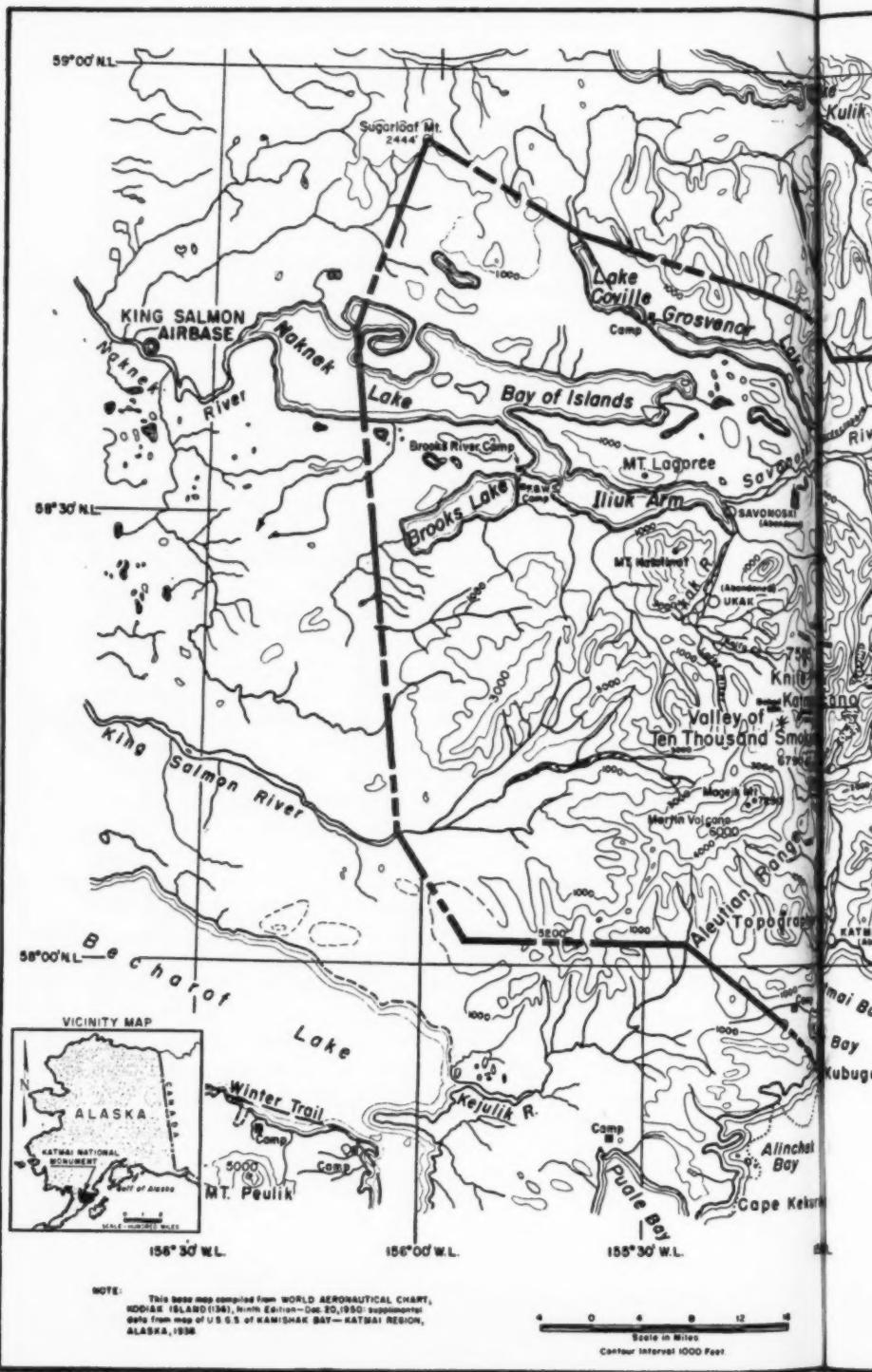
Dr. Griggs (1922*) and his associates of the National Geographic Society expedition, arriving at the scene of the eruption in 1916, found in the devastated valley and volcano a new wonder of the world. In 1918, following their investigations, the area became by proclamation Katmai National Monument.

As the years passed, most of the steam vents, which in the public mind were synonymous with the entire story of the area, gradually subsided. And as it became known that the Valley of Ten Thousand Smokes had quieted down, general interest in the monument lessened.

But the smokes constitute only one of the many chapters in Katmai's uniquely diversified story. It was in recognition of this fact that in 1931 the boundaries of the monument were substantially enlarged to protect various related historic and scientific features, as well as the brown bears, moose, and other wildlife of the area. In 1942, for similar reasons, Katmai's coastal islets were added. They are comparable to those of Washington and Oregon in scenic quality and as refuges for marine wildlife.

In 1950 Katmai's isolated condition began to change rapidly. A string of wilderness fishing camps was established on the chain of interior lakes by Northern Consolidated Air Lines, and daily connection with airports of the outside world was provided by float plane. As early as World War II, the armed forces fished in the monument and established rest camps not far outside, but their facilities were not available to the public. Now for the first time visitors were able to come to the monument regularly and in appreciable numbers. Almost immediately prominent newspapers in the United States ran illustrated articles on the monument's spectacular scenery, the huge fish, and the brown bears, thereby calling the attention of millions of people for the first time to features other than the dwindling smokes.

As yet, however, Katmai's magnificent attractions are just beginning to





become known. Responsible people still ask all too frequently whether there remains anything in the region worth preserving "now that the smokes are gone." To anyone fortunate enough to have visited the region, such a question seems fantastic, yet there is real danger that, unless knowledge of the monument's splendor becomes more widespread, it may be irreparably damaged by those pressures of exploitation that always arise in new frontier areas.

2. Seacoast, Ice, and Ashes

FOR A COMPREHENSIVE look at Katmai National Monument, largest, wildest, and, in the opinion of some, the grandest of all National Park Service areas, our expedition took an airplane flight around its boundaries. We—George L. Collins as chief, Adolph Murie, Thomas Williams, and I—were part of the National Park Service's Alaska Recreation Survey, and we set out in June 1951, in part to study further what had happened in the Katmai area after almost forty years of slow recovery. Along the frequently storm-lashed coastal waters of this wild region, fishing boats and a few other seagoing craft—chief transportation of yesterday—still beat their laborious way. Today's transportation, the automobile, is absent, and perhaps may never come. For already, before men could smooth a way through the rugged and watery landscape for their little hard-surfaced ribbons, tomorrow's transportation, the airplane, has arrived.

You can fly to the monument overland from Anchorage, three hundred miles to the northeast, or from Naknek air terminal, only sixteen miles to the west. However, the striking geographic features are most easily grasped if you take the over-water air route, as we did, from Kodiak Island, thirty miles to the southeast across Shelikof Strait. A Catalina flying boat was made available to our party by Rear Admiral Joseph Greenspun, in command of the Coast Guard in Alaska, and Lieutenant Commander E. A. Crock, our pilot, who was in immediate charge of the Air Detachment at Kodiak.

It should be emphasized that at Katmai one must wait for the infrequent perfect day to take such a comprehensive trip as ours. Cloudy weather and rain showers are habitual, in summer at least, particularly along the seacoast and among the high peaks. The inland forest and lake country, where the fishing camps are, has more warmth and sunshine, although in the afternoons high winds frequently sweep over the more open, unprotected areas such as the Valley of Ten Thousand Smokes and the larger lakes. For air travel, fullest use should be made of the early

morning hours, which often are windless and clear even when less favorable weather is due for the balance of the day.

As we approached from over Shelikof Strait on the 24th of June, the Aleutian Range gradually rose like a gleaming white backdrop for the monument's one-hundred-mile panorama of fiords and bays. Behind this mountain wall, not visible as yet, lay the immense inland wilderness which includes the lake chains and the Valley of Ten Thousand Smokes. Although the crest of the range is for the most part situated eight to twenty miles back from the seashore, low, broad valleys and deep bays run far inland to the bases of the 7,000-foot peaks, accentuating their height. As we neared the mainland, heading for mountainous Cape Kubugakli, southernmost boundary corner of the monument, the highest, glacier-draped peaks formed a magnificent procession along the skyline.

Farthest left and closest to the cape was 7,200-foot Mount Mageik, with vigorously smoking Martin Volcano rising as a secondary hump on its long flank. To the right of this was a low gap in the range, the famous Katmai Pass, an important overland crossing place on the Alaska Peninsula before the explosions. Faint and far away, the yellowish Valley of Ten Thousand Smokes can be seen on a clear day beyond this pass.

To the right of Katmai Pass is Trident Volcano, followed in turn by the ragged silhouette of the present 6,000-foot stump of Mount Katmai. Then, still farther to the right, extending in grand procession toward the horizon, are the seven-mile-long crest of Snowy Mountain (7,100 feet); 7,600-foot Mount Denison, highest of them all; next, Kukak Volcano and that sharp pinnacle, the Devil's Desk; and, farthest off but still gleaming brightly, the icy summits of Fourpeaked Mountain and Mount Douglas, eighty miles away at the other end of the monument.

Valleys, Harbors, and Islands of the Coast

As Cape Kubugakli's wind-swept, treeless slopes drew near, we descended gradually until the line of breakers was just ahead. Then we turned northeast and flew low along the beach toward a seemingly endless succession of wild bays and fiords. As we came closer, the first impression of bleakness was replaced by a feeling of hospitable abundance. Several king crabs, giants of their kind, were seen in the azure shallows along the immediate shoreline. The foreshore was a brushy flatland, crossed by many small, clear streams from the highlands rising immediately behind. Game tracks were much in evidence. The whole prospect in this first contact with the shore was one of lush greenery, gentle topography, and rich color everywhere.

The bays seem endless, their variety infinite. A month's hike along this seacoast, from one end of the monument to the other, would be wonderful experience. Crossing the mouths of some of the rivers might be a problem, but at least one would not lack materials for fire, for everywhere the beaches are piled with driftwood. No doubt one would also find along these unplundered shores the bones of whales, fragments of ancient wrecks, and unexpected curiosities cast up by the waves.

Kashvik Bay. Wind-swept Kashvik Bay, beneath the flank of Mount Kubugakli, is wide, shallow, and filled with pumice from the eruption. It is bordered by fresh-water lagoons on the Cape Kubugakli side. Almost everywhere are alder thickets, through which wind the trails of the giant brown bears.

Katmai Bay. Katmai Bay and broad, low Katmai Valley are still clogged by the great outpouring of pumice and ash. The wide but shallow and many-braided Katmai River works its way through the valley's barren wastelands, whose original cottonwood forests have not yet begun to reappear. This valley somewhat resembles in its desolation that other one directly across the pass—the Valley of Ten Thousand Smokes.

Katmai Valley is walled in by tall ridges, bare and snow-streaked on top but covered with a dark green mantle of alders and willows at the lower levels. Some sixteen miles upstream, the east fork of the valley narrows to a canyon whose sheer walls are colored in delicate greens, pale yellows, blues, and soft pinks. Griggs found it to be almost as deep as the Grand Canyon.

Dakavak Bay. Beyond Katmai Bay the force of the eruption was deflected by high ridges and was progressively diminished by distance. Coming down to meet broad Dakavak Bay is a wide friendly valley, its river bordered by groves of cottonwoods—the more familiar name for the Balsam Poplar (*Populus balsamifera*). (The Black Cottonwood [*P. trichocarpa*] also occurs along the streams.) A brown bear, startled by the roar of our motors hardly five hundred feet above his head, burst out of the alder thickets in a lumbering gallop, but we passed him so swiftly that almost immediately he found himself running after us instead of away from us, which brought him to a confused halt as we sped away.

Farther up the valley the green hills, densely alder-mantled but with open grassy spots, enclose beautiful Dakavak Lake. Similar lakes are visible in several of the other coastal valleys, but the region has been so little explored that not all of them are shown on the maps.

Amalik Bay and Geographic Harbor. Rounding the next cape, we came upon island-dotted Amalik Bay and the celebrated, fiord-like continua-



Magnificent Katmai

FROM THE AIR BY LOWELL SUMNER

(Above) Cape Kubugakli, southern boundary corner of the monument. The lagoons are havens for waterfowl and huge king crabs. Game trails are everywhere in evidence . . . (Below) Low Katmai Valley, and the broad bay, are still clogged with ash and pumice from the eruption. The forest has not yet reappeared. This view looks out over Shelikof Strait to distant Kodiak Island.





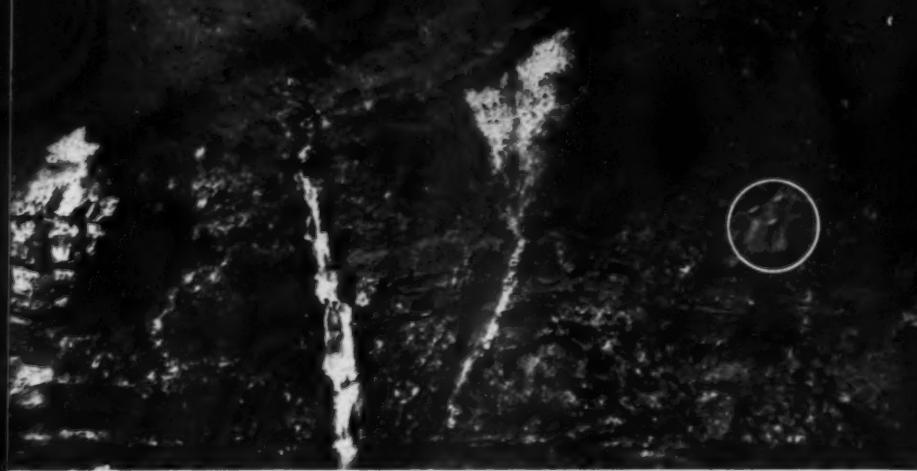
Dakavak Bay was protected from the eruptions by ridges. In its friendly valley we saw the first of many Alaska brown bears. . . . At Geographic Harbor's upper end there is a fresh-water lake. The enclosing walls are so steep it is almost incredible that they could be densely clothed with alders.





These low, glaciated promontories guard the entrance to Geographic Harbor, but there are channels deep enough for large vessels to enter. . . . Around Kukak Bay, spires of rock are favorite sites for the great stick nests of American eagles. Accustomed to supremacy in the air, they watched us, like this one whose white head is visible in the nest, but did not fly away.





In Kukak Bay three Alaska brown bears floundered and slid in their haste to climb the steep, loose gravel. We counted ten from the air in about an hour. . . . Missak Bay's long beaches, grassy slopes and dense alder jungles have remained undisturbed, in the possession of the bears.





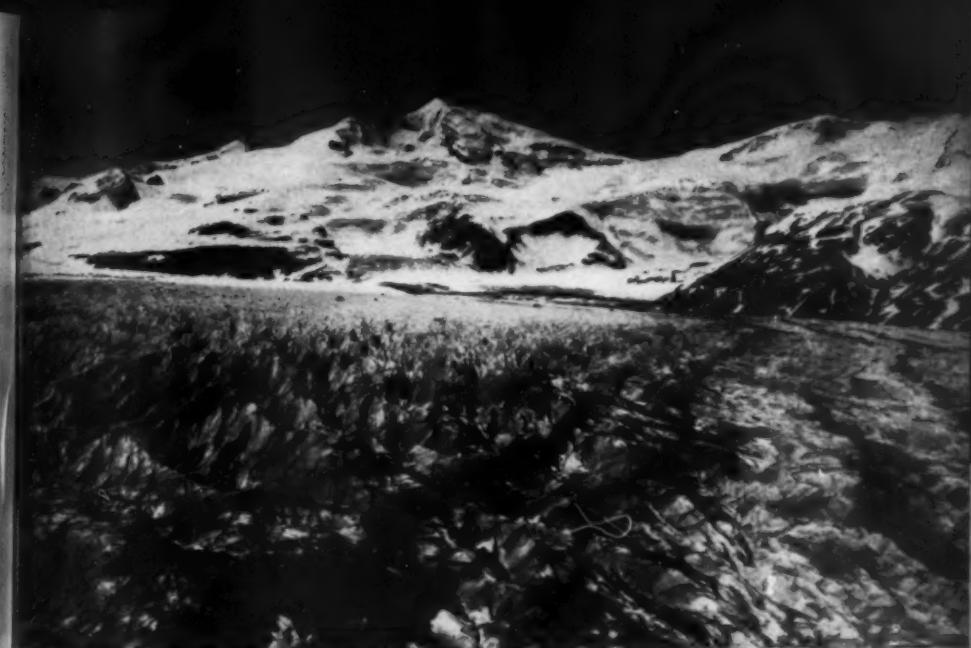
Inside the narrow entrance to Geographic Harbor is a spacious anchorage. Not snow but pale yellow ash from the eruption makes this variegated pattern with the dark green vegetation. . . . Each of Kukak Bay's three valleys is a separate, unexplored wilderness. Running almost at sea level, the left one almost connects with Kinak Bay through a low divide.





Back of Hallo Bay this wilderness of cottonwood groves, ponds, swamps, jungles of alder and willow, and low grassy ridges is a summering ground for water-fowl and shore birds; a year-round home for beaver, mink, foxes, occasional wolverines, and the ever-present bears. . . . On rolling, sheltered benches near Kukak Bay, where groves of spruce and birch alternate with open grassy places, a bear can doze undisturbed in the shelter of these rocky banks.





Hallo Glacier, coming down from the icefields of Mount Denison (7,600 feet) and Kukak Volcano. . . . Up the coast from Hallo Bay, long, straight beaches lead to the tiny clam-digging settlement of Kaguyak.





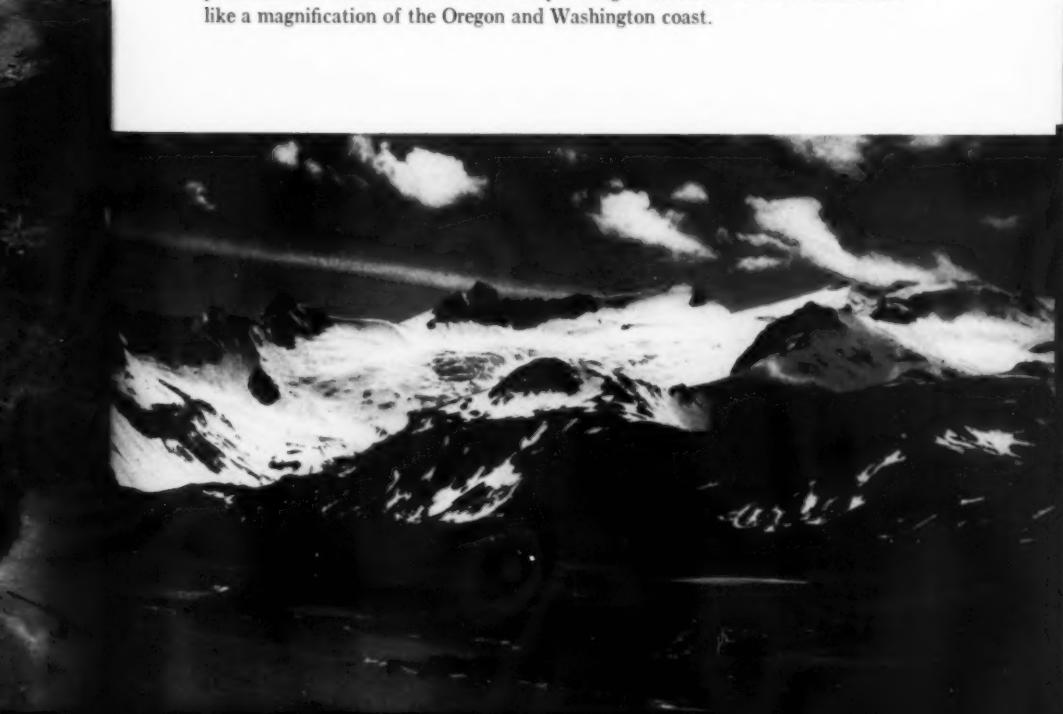
An unexplored, partly wooded valley, dotted with occasional ponds, penetrates far inland from Hallo Bay, around and almost behind the Devil's Desk. . . . Kaguyak, a collection of about six shacks, is occupied during the summer months. Driftwood for fires lies everywhere along the coast. The razor clams dug here at Kaguyak at low tide are eight to ten inches long.





In the Kaguyak region is an almost unknown crater, approximately two miles across, and brimming with water. Photo By A. C. Kuehl. . . . The rock-bound peninsulas and offshore islets of the Cape Douglas section of the monument are like a magnification of the Oregon and Washington coast.

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Devil's Desk region, looking southeast from the Douglas River valley over the narrow neck of the monument toward distant Kodiak Island across Shelikof Strait. . . . Brooks Falls is known for the fly fishing in its vicinity.





Beautiful Brooks Lake (foreground) is only a half mile from Lake Naknek (background), with which it is connected by the broad, swift-flowing Brooks River, famous for its great fish and for the beauty of its falls. . . . Among groves of cottonwoods at the river's mouth is Brooks River Camp, present headquarters for Katmai National Monument.



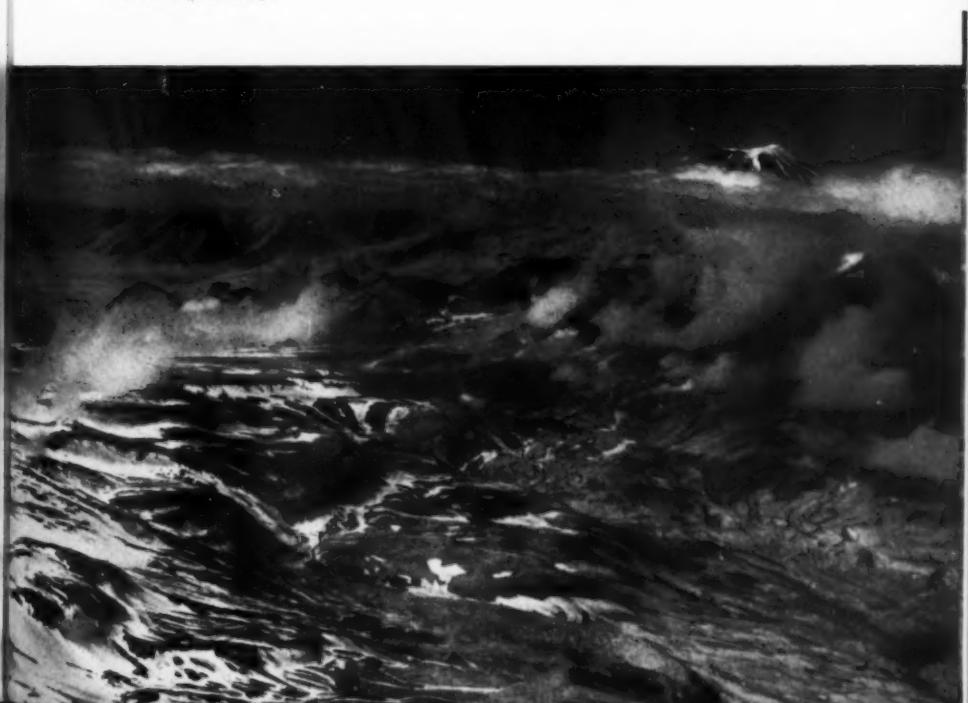


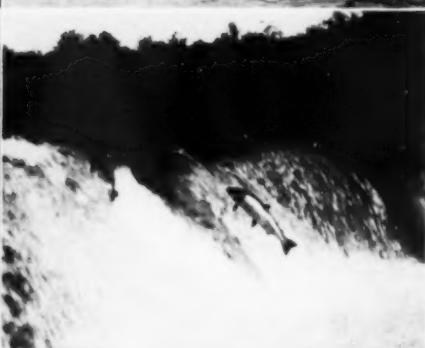
Ever since the eruption of the Katmai region in 1912, clouds of steam and sulphurous gases have billowed steadily from Martin Volcano's cavernous throat. . . . Exploded Mount Katmai's jagged-rimmed bowl is more than two miles across. Contrasting with the dark rock of its towering inner walls is this mile-long lake of unbelievable jade green. Photo by Adolph Murie.





Inside Mount Katmai's crater the horseshoe-shaped island that Griggs once saw has been covered by the rising waters, and new glaciers have softened many of the rugged contours. . . . Beyond desolate Katmai Pass (center) and the flank of cloud-draped Knife Peak lies the desert Valley of Ten Thousand Smokes (far left).





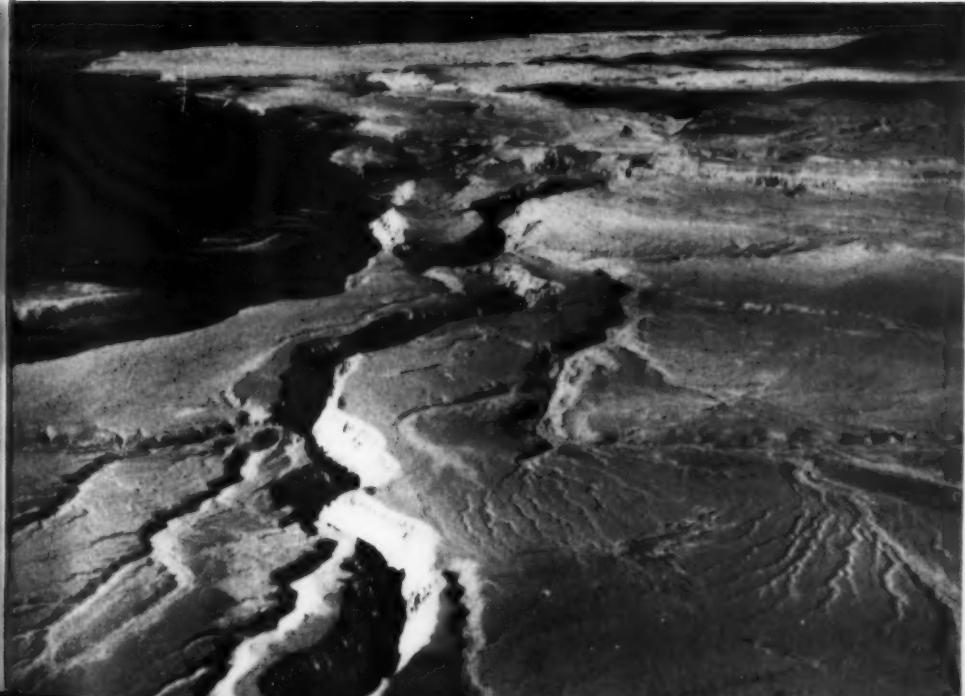
(1) Spruce woodland on stream flowing into Naknek Lake; (2) camp on Naknek shore; (3) on old "trail" (overgrown with four-foot grass) to Valley of Ten Thousand Smokes; (4) fording Ukak River—by A. C. Kuehl. (5) A lake trout and two rainbows, Lake Coville—by George L. Collins. (6) Salmon leaping Brooks Falls—by Northern Consolidated Airlines.



Novarupta Volcano, Valley of
Ten Thousand Smokes —
Northern Consolidated Airlines



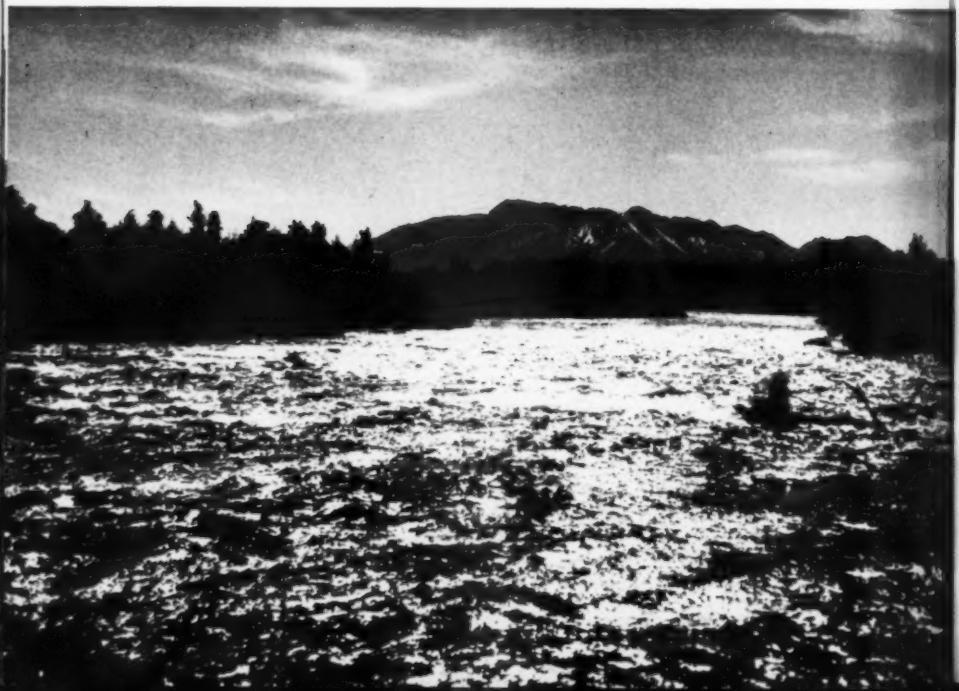
Seals, marine birds, and occasional sea otters inhabit Katmai National Monument's coastal section. Cape Douglas in background. . . . Smooth enough to ride a bicycle on in 1919, the valley floor now is fissured by pink-walled canyons two hundred feet deep cut by the Ukak River and its tributaries.



Valley of
canyons —
by
Airlines.



This lonely collection of ancient, half-flattened log structures (barely showing in the clearing) is all that remains of Savonoski, abandoned in terror by the natives at the outset of the eruption. . . . Fisherman's view of the Brooks River, downstream from the falls.



tion at its upper end christened Geographic Harbor by the Society's scientific expeditions.

A labyrinth of low, rocky promontories, worn down by glaciation in ancient times, guards the mouth of Geographic Harbor; yet the National Geographic explorers found the water to be deep enough for large vessels even in these constricted passageways. Beyond them the harbor opens out into a spacious anchorage enclosed by high mountain walls, spectacularly patterned for miles with variegated areas of dark green vegetation and pale yellow volcanic ash, deposited here to a depth of many feet during the eruption. Here, as elsewhere along the Katmai coast, a fresh-water lake lies a short distance higher up behind the harbor. The near-by walls are extremely steep; nevertheless—and incredibly—they are densely clothed in alders.

Wildlife was abundant in and around the offshore kelp beds of this general region. Seals could be made out, as well as many sea birds. The rare sea otter, owner of one of the world's most lustrous fur coats, has been reported here by others, and whales are not uncommon.

Kinak Bay. The fog of Shelikof Strait extended so deeply inland that we did not see Kinak Bay. Griggs wrote, "It is constricted between two great cliffs into an exceedingly narrow passage which opens into an exceptionally beautiful basin, which we named Hidden Harbor." His map shows a fresh-water lake a short distance back from the harbor.

Missak Bay. The cliffs, canyons, and snow-capped spires at the head of Missak Bay would seem outstanding in any region less scenically endowed. But in Katmai the merely excellent does not long hold the astonished visitor's attention. Therefore, one is inclined to pass by Missak Bay's mountains, long beaches, grassy slopes, and dense jungles of alder growth with the feeling that, since this region has always belonged to the great brown bears, it should remain in their possession, undisturbed.

Kuliak Bay. Likewise Kuliak Bay, with its various branches and lesser coves, overlooked by grassy bluffs that lead gradually up to towering peaks, gave rise to this thought: "In this one place I could spend a whole summer, finding something new each day. But now I must see around the next cape, and the next."

Kukak Bay. This bay comes as a climax in some respects greater than that of Geographic Harbor, though offering a somewhat less sheltered anchorage by reason of its size and the lower elevations of the surrounding ridges. The comparatively narrow entrance is further constricted by mile-long Aguligik Island and numerous smaller islets. Here is the new Kukak clam cannery, as distinguished from old Kukak village, aban-

doned in 1912, shown on the opposite side of the harbor in the U.S. Geological Survey map of Kamishak Bay and the Katmai Region published in Alaska in 1938.

Inside its entrance, the branching harbor curves to the left until it roughly parallels the main coast line, from which it is protected by hills and low mountains. This spacious inland waterway is a haven for ducks, geese, and sea birds. The leftmost winding inlet terminates in a series of lagoons deeply enclosed by rolling, green slopes. Emerging from this inlet and still holding to the left side of the main bay, we rounded a peninsula, slipped between Aguchuk Island and the hills of the shore, and broke out into the broad upper end of the harbor. From here three wide valleys fan out toward the distant heights of Snowy Mountain and Mount Denison.

Each of these valleys is a separate, unexplored wilderness. The leftmost of the three follows the same directional trend as the bay itself, and runs nearly at sea level for eight miles behind the coastal hills, roughly paralleling the strait. It almost joins the upper end of Kinak Bay before it curves to the right and approaches the long white flank of Snowy Mountain.

The central valley, also low and flat, heads straight for Snowy Mountain, ending at the snout of Kukak Glacier, which winds down like a stairway from the white slopes.

We swung around now and flew back along the north shore toward the entrance of the bay. A succession of small streams rushed down the green mountainside, hurtling over a two-hundred-foot cliff in slender white ribbons, which cascaded directly upon the beach below. Near these falls we passed three brown bears in a group at the top of the cliff. Banking in a tight circle, we came around for another closer view, which caused the startled monsters to flounder and slide in their haste to climb the steep, loose gravel slope.

A few minutes later we came upon some of the most beautiful bear country yet seen. On a rolling, sheltered bench, groves of spruce and birch alternated with open grassy places. Scattered at intervals were low protecting cliffs and rocky banks where bears might doze in the sun undisturbed.

Near the entrance of Kukak Bay, spires of rock fifty to one hundred feet high stand in varying degrees of isolation from the main cliffs, of which they were once a part. The tops of these unscalable towers are favorite sites for the great stick nests of the American eagle. Eagles, and most of the other lesser hawks, are notoriously disinclined to yield the right of way to airplanes, even in the States. In this respect they differ from waterfowl and most other non-predatory birds, probably because

they are accustomed to supremacy in the air. Whatever the reason, the Katmai eagles behaved true to form, for those which were sitting on their rock-pinnacle nests made no move to escape, but merely turned their heads to eye us when we skimmed five hundred feet above them.

Hallo Bay. Beyond Kukak Bay the hills begin to draw back from the sea. The bays are broad but no longer are they deep indentations in the shoreline. Along their miles of gently curving beaches one could explore for days. Back of the beaches on the rolling coastal plain lies a wilderness of cottonwood groves and spruce, ponds, swamps, jungles of alder and willow, and low, grassy ridges. This country must be a summering ground for waterfowl, shore birds, and bright-colored warblers; and a year-round home for beaver, mink, and foxes, as well as the ever-present bears and occasional wolverines. The region probably can be penetrated most readily by following the gravel bars of the shallow winding streams.

From the icefields of Mount Denison and Kukak Volcano above Hallo Bay comes a glacier, its gleaming surface marked with parallel lines of dark rock like streaks of dead leaves floating on a sluggish stream. At the north end of the bay a wooded valley, dotted with occasional lakes, penetrates far inland around and almost behind the Devil's Desk. For sheer uninhabited wildness, grandeur, and the thrills of exploration that it offers, this valley surely rivals British Columbia's celebrated Driftwood Valley (Stanwell-Fletcher).

Kaguyak and Swikshak Bay. After a while such endlessly spectacular scenery becomes too much for the mind to digest completely. We barely noted on leaving Hallo Bay, a lagoon or lake bordered by alders and willows and shown without name on the map. Great numbers of loons, swans, ducks, brant, and other waterfowl must congregate here during the spring and fall migrations. Then we were flying low over the long straight beach toward the tiny clam-digging settlement of Kaguyak.

Little or nothing remains of old Kaguyak village, which was abandoned in 1912. The present Kaguyak, situated on the beach beside a small lagoon, is a collection of about six shacks, which are occupied during the summer months, when the clam diggers sail their fleet of skiffs in here to gather the harvest at low tide. Since the monument boundary is at the mean high tide level, clam digging comes primarily under the jurisdiction of the Fish and Wildlife Service rather than the National Park Service. The eight-to-twelve-inch clams are taken for processing to clam canneries like the one at Kukak Bay. Swikshak Bay, where clams are also dug, has a narrow and comparatively small tidewater area, but the river valley, bounded by high, snow-covered ridges, is immense. A glacier comes down

from Fourpeaked Mountain at its head, where the scenery equals or surpasses that of many national parks in the United States.

Two Crater Lakes in One Monument. Opposite Kaguyak, the Aleutian Range curves away from the seacoast around the head of an exceptionally spacious, three-pronged valley. In doing so, it also loses considerable altitude before swinging back to the coast and rising abruptly again at Fourpeaked Mountain.

This valley is, if possible, even more remote and wild than the one in Hallo Bay, and considerably more extensive. The left arm penetrates some sixteen miles past and around behind the snow-covered crest, where it is separated from the valley of Hallo Bay by a low divide. From this point, one could hike three or four miles at an elevation of less than three thousand feet and enter the headwaters of the Savonoski River in the interior lake country.

The central arm of the valley, equally wild and long, runs at an elevation of less than 1,000 feet all the way across the narrow neck of the monument to the north boundary, and is separated from the Kamishak River valley on the north by a pass of less than 2,000 feet elevation. If the Kamishak and Douglas River valleys ever become settled, as is sometimes predicted, this pass probably would become one of the access routes into the monument. The region appears to be less subject to fog, which hampers air travel, than the approach from Naknek (Thompson, p. 470).

In addition to its hospitably low elevations, its immensity, and its wilderness, the valley across the monument's neck is adjacent to one of the most beautiful and striking features of the entire region—an unnamed and almost-unknown crater approximately two miles in diameter and brimming with water. This crater lake, from whose depths rises a small volcanic cone, was white and frozen when we saw it. But when the ice melts in July, it becomes a wondrous blue (Kuehl, 1947).

The lake inside the crater of Mount Katmai was explored by the National Geographic Society soon after the eruption and again in 1931 and 1932 by Father Hubbard. But the Kaguyak crater was unknown to these explorers. It is not shown on the U.S.G.S. map of 1938, but did appear about the time of World War II on World Aeronautical Charts compiled by the U.S. Coast and Geodetic Survey with the assistance of the armed forces. Even now, so far as the National Park Service is aware, no descriptions of this crater have been published, and few persons, even in Alaska, appear to be aware of its existence. Thompson (p. 452) gives it only passing mention as "an unnamed small caldera with a fine crater lake behind Kaguyak Cove."

The crater's irregular and deeply eroded walls give the impression of greater age than those of Katmai. Significantly, at the time of our visit in the last week of June the Kaguyak crater lake was still frozen, although it lies at an elevation of less than 2,000 feet, and is almost surrounded by spacious, snow-free lowlands. By contrast, on the same day Mount Katmai's crater lake, at an elevation of approximately 4,000 feet and ringed by snow-covered summits, showed no sign of having ever been frozen, indicating that the water in that crater has not yet cooled.

Although the Kaguyak crater is only about six miles inland from the clam-digging settlement of the same name, the high, concealing rim resembles other ridges in the vicinity. Therefore, it is doubtful that many fishermen are aware of the crater's existence.

Coming in from the seacoast, one would find the going swampy in some places, impeded by shoulder-high grass in others, and uncharted everywhere. There would also be bears. However, with luck, one might expect to reach the crater's mysterious rim toward the end of the day—a day not likely ever to be forgotten.

The Cape Douglas Region. The cold, lofty beauty of the Cape Douglas region introduces another of Katmai's manifold aspects. From the twin masses of Mount Douglas and Fourpeaked Mountain, a succession of glaciers descends to the narrow, precipitous shore line, whose cliffs, rock-bound peninsulas, and offshore islets are like a magnification of the Oregon and Washington coast.

We rounded Cape Douglas and bleak Sukoi Bay, passed between Shaw Island and a sheer-walled peninsula that recalled California's Anacapa Island, and were at the northernmost boundary corner of the monument. Here we had reached the end of the shining wall of mountains first seen on our approach over Shelikof Strait.

Turning inland now, our plane began to climb up from the low, green Douglas River valley situated on the other side of the wall. Near the upper end of the valley a large waterfall poured over a cliff, falling several hundred feet into the canyon. From here Mount Douglas and Four-peaked Mountain were as splendid and austere as before, their glaciers even more numerous. Ahead lay the snow-covered divide between the headwaters of the Kamishak River valley, just outside the monument, and those of the Savonoski River, down which we would soon be flying toward the chains of lakes. Leading up to this divide and disappearing over its crest, a broad trail in the snow showed frequent use. No human trail this, but one of the ancestral crossing places of the bears. On our left the crater lake of Kaguyak drifted by in the distance, then the headwaters

of Hallo Bay's nameless wild valley, curving behind the ice-encrusted Devil's Desk.

Inland Forest, Lake Chains, and an Active Volcano

Now we slanted down from the sea of snow-flecked peaks over the valley of the Savonoski River, on whose distant reaches dimly glimmered Lake Grosvenor and branching Naknek Lake. This immense swampy lowland, trackless but offering few obstacles of altitude or slope to the traveler, is partly covered with cottonwoods, birches, and spruce, elsewhere with dense grass and thickets of willows and alders. Living here undisturbed, and rarely seeing man, are moose, marten, otters, beavers, and the brown bears that gather along the streams in the spring to fish for salmon.

As we drew nearer, the larger lakes, stretching to the horizon, looked like arms of the sea. In the foreground lay slender Lake Grosvenor, curving for eighteen miles between steep mountains, and separated from eight-mile Lake Coville by a narrow forested isthmus. Across Lake Grosvenor, on the other side of a great marsh, we could make out forty-three-mile-long Lake Naknek's Bay of Islands, beyond this the sloping ridge of Mount Lagorce, and farthest away of all the silvery gleam of Lake Naknek's Iliuk Arm.

Passing over Lakes Grosvenor and Coville, and many an unmapped pond and slough, we neared the monument's western border and could appreciate Lake Naknek's intricate immensity. Curving peninsulas created bays as big as ordinary lakes, and within these still other peninsulas and island chains enclosed lesser, island-studded bays. The shorelands of Lake Naknek are mostly low, rolling, and grassy, but the Iliuk Arm, which extends among the outlying mountains of the Aleutian Range, is surrounded by a primeval forest of spruce, birch, and cottonwoods. The low granite islets in the Bay of Islands are also forest-covered.

We crossed Lake Naknek and flew toward beautiful Brooks Lake, itself surrounded by the forest. This lake is only a half mile from Lake Naknek, with which it is connected by the broad, swift-flowing Brooks River, famous for its great fish and for the beauty of its falls. Among the cottonwood groves by the river's mouth a small cluster of tents bathed in the peaceful afternoon sun—Brooks River Fishing Camp, present site of the monument headquarters, where we would spend the night. But we did not stop yet, for one last climactic region lay ahead.

Beyond the eleven-mile expanse of Brooks Lake, the foothills began to rise toward Mount Mageik and the other volcanic crests of the distant

procession. Steering toward Mageik's western slope, we approached the Aleutian wall from over the King Salmon River. As we came around the end of the wall, the western sun made a silver sheen on Katmai Bay and glittered on the white peaks of Kodiak Island across the Strait. But our attention was drawn from the grand coastal panorama to the smoking volcanic cone approaching on our left.

Martin Volcano. Seen against Katmai National Monument's huge scale, Martin Volcano is a comparatively small cone, situated at the west end of Mageik's elongated crest. But it appears far from small on close approach to the clouds of steam and sulfurous gases that billow steadily from its cavernous throat.

As we revolved in tightening spirals closer and closer around the dazzling white summit, the swirling vapors continually shifted and changed shape, affording momentary glimpses over the jagged, snow-encrusted rim into the dark and weird interior. During one such pass the bottom of the steaming pit was revealed for an instant. Among the jumbled boulders at the foot of the shadowy, vertical walls lay a patch of snow, melting away where it bordered a pool of hot mud. From this mud cauldron and adjacent gravel slides rose hundreds of small steam jets, which united as they floated upward and, on reaching the cold air at the crater's rim, blossomed suddenly into the billowing white cloud.

Spurred by this glimpse, we came around in one last swoop over the lowest notch of the crater. But at that moment the steam cloud eddied up and filled the entire entrance. We had a momentary view of Hades in a swirling, gaseous blackout; a strong smell of sulphur filled the cabin; and then we shot into the sunlight and soared away over the glistening slopes toward Katmai Crater.

Katmai and the Valley

All morning we had flown in cloudless skies, but now the white cloud shapes were beginning to curdle here and there along the line of high peaks. We looked down for a moment on the goosenecks of the upper Katmai River, deeply eroded into the desolate, pale volcanic ash, but near-by Trident Volcano was disappearing under the white cloud-blanket forming below. Then suddenly we came out again over the clear shining crest. The strange configuration of the landscape, its brilliant clarity and unearthly coloring were like something in a dream. In the background white-crested Knife Peak rose with the symmetry of a Japanese volcano. Beneath us lay a jagged-rimmed bowl more than two miles across, its outer slopes shining white, its towering inner rock-walls varying shades

of brown—and in its depths, fed by a ring of small, immaculate glaciers, a tranquil mile-long lake, not blue like that other one, but unbelievable jade green.

The immensity of the crater's void enabled the only half-believing mind to grasp more clearly the reality of those awful "snowstorms" of pulverized and burnt-out rock of almost half a century ago.

Griggs and his exploration party had considered the raw 3,700-foot crater walls almost unscalable, but the accumulated snow of forty winters has deeply covered and softened many of the rugged contours. Today the glacier at the notch overlooking Katmai Valley forms a smooth incline to the water's edge, and in 1931 Father Hubbard and a companion succeeded in reaching the lake by this route. The horseshoe-shaped island of the early days has disappeared, and a comparison between Griggs' 1916 photographs (pp. 172, 178) and ours of 1951 indicates that it has become submerged by the gradually rising waters. However, unlike Kaguyak's crater lake, 3,000 feet lower in elevation, the lake in Katmai's crater still churns sluggishly with the vapors and warm currents which, since its birth, have prevented its freezing.

Of the world's innumerable glaciers, those within the interior of exploded Mount Katmai are unusual in that the time and the conditions attending their birth are known. This circumstance will provide glaciologists with an accurately-dated sequence of records for measuring trends in the earth's climate.

The Valley of Ten Thousand Smokes

The clouds were growing thicker all up and down the range, so that now only the top of Knife Peak was visible. With a last glance at Katmai's jade-green lake, we came back over Katmai Pass and slanted down into that warm, dry, cloudless, desert region—the Valley of Ten Thousand Smokes. If you have been to Death Valley, you can better visualize Katmai's valley of desolation. Both have the same pale brown landscape seemingly devoid of life, the same immense flat floor walled in by naked mountain ranges. But Katmai's mountains are more snow-covered, and its slanting valley, which is deeply channelled by rushing streams, comes to an end at the edge of a primeval forest, near the winding shores of a great lake.

Although most of the smokes are gone, seven large ones with columns 500 feet high, and an unknown number of smaller ones, remain near the base of Baked Mountain and Broken Mountain. There is also a large smoke on the adjacent slope of Mount Katmai, and wisps of steam are

seen occasionally at the small summit crater of near-by Knife Peak. At the head of the valley itself, Novarupta, the low, dome-shaped lava plug that broke through to the surface during the eruption, now smokes comparatively quietly. In 1950 National Park Service observers discovered at its base a small new cone, perhaps fifty feet high, which apparently had been pushed up during a minor outburst of activity observed about the first of July that year. In 1931 Father Hubbard referred to similar formations in this vicinity as volcanettes.

However, new chapters in the valley's geological and biological history continue to unfold, so that it might now appropriately be called "Evolution Valley." Most obvious has been the development of the river channels. In 1919 Griggs (*op. cit.*, p. 253) observed that "One could ride a bicycle for miles along its smooth surface . . ." This was because most of the stream-flow from the surrounding snow-filled water sheds was vaporized by the hot ground as soon as it entered the valley. But when the ground began to cool, the Ukak River and its tributaries became swift, turbulent streams, which cut deep and tortuous channels through the soft ash surface.

Today the Ukak River flows between sheer cliffs of ash from one hundred to two hundred feet high and, having reached its original gravel bed, reveals the great thickness of the overlying volcanic deposits. And though a bicycle trip would be somewhat unrewarding, one can enjoy other attractions. The color of the new cliffs varies from white to deep, rosy pink like those of Bryce Canyon National Park, and the cliffs are beginning to erode through wind action into fantastic spires (Kuehl, 1945).

On the sides of some of the cliffs the downward-cutting waters have uncovered charred fragments of the early forest that were buried by volcanic ash at the time of the eruption. New vegetation, previously unable to secure a foothold in the ash blanket, has come to the gravel bars of the old stream bottoms. Thickets of willows and alders are most luxuriant along the lower reaches of the Ukak but some trees extend in suitable locations even to the headwaters of the Lethe River.

Lower and lower we glided above this valley—a desert which lies in the heart of a swampy peninsula and is separated by a single mountain range from the storm cradle of the North Pacific. Flying about 200 feet above the valley floor, we could look out over its warm, bright expanse extending for fifteen miles in the sunlight, down into the shadowy depths of the Ukak River canyon, and back at the snowy peaks receding in the distance.

A remnant fringe of standing dead snags, smothered forty years ago by the avalanche of pumice, flashed past. Now we were out of the valley

and the untouched forest was beneath us. The Iliuk Arm of Lake Naknek lay just ahead, and we were flying over a wilderness of spruce toward the broad Savonoski River, flowing in from the right. In a little clearing on the beach, close to the river's mouth, we saw a lonely collection of ancient, half-flattened log structures. Trees grew out of their roofless interiors, and many were almost completely hidden by the jungle growth of forty years. This was all that remained of the native village of Savonoski, whose inhabitants fled before the dreadful earthquakes that warned them of the impending destruction.

We had made the complete circuit. Brooks River Camp lay not far ahead, and our air tour of magnificent Katmai was ended.

3. Bears, Birds, and Rainbow

ALMOST AS SOON as you enter the monument, whether from the coastal side or the interior, by water or by air, you begin to see evidence of bears. Their broad trails traverse the grassy benchlands, follow the sea-shore and the river banks, and lead over the mountain passes. Even at Brooks River Camp most of the river trails now used by the fishermen were made by bears.

So far, the meager funds received by the National Park Service for the protection and development of Katmai National Monument have been insufficient for the construction of adequate trails. From the Brooks River Camp, a tractor trail has been worn in the dirt by the Fish and Wildlife Service in hauling materials and supplies to the salmon-counting station on Brooks Lake; and in 1951 the Service did some limited trail building. But these are exceptions. Elsewhere in Katmai National Monument, if you come upon a well-marked trail, it's a bear trail.

Alaska brown bears resemble giant grizzlies and are the largest carnivorous animals on earth. The adults measure up to nine feet in length, stand eleven or twelve feet high when on their hind legs, weigh fifteen hundred pounds and, as Griggs put it, have a head "as big as a wash-tub."

When you first encounter their footprints, you are apt to stop and stare, for the hind ones measure about ten by sixteen inches, which is big enough that a man can easily stand in one with both his feet—a big man. So broad-beamed are the makers of these trails that in sand and snow they leave two separate parallel lines of tracks which at a distance resemble those of a small tractor.

Though technically classed by zoölogists as carnivores, the brown bears of Alaska are largely vegetarians, and such meat as they obtain usually is humble fare. They forage for hours at a time on the open grassy slopes,

cropping grass like cows or ploughing up the earth with their powerful forearms and monstrous-clawed paws in search of roots, and nests of mice and ground squirrels. In the fall they finish off on the blueberry and cranberry crops as dessert before the hibernation period.

When the salmon migrate up the streams in the summer, the bears have a concentrated course of meat, and for this reason are most likely to be seen from July until late in September. William J. Nancarrow, Park Naturalist of Mount McKinley National Park, drifting ten miles down

the Savonoski River in a disabled boat, passed twenty-three fishing bears. He came within a few yards of some of the wading monsters, but remained respectfully quiet and was relieved to be ignored by them.

Ordinarily the bears get their fish by wading into the water and seizing one from a densely-packed throng with their front paws. Three or four tries may be necessary to achieve a capture (Cahalane, 1947). But in 1951 a



fishing party came back to Brooks Camp with the unlikely-sounding story that the bears of the Savonoski River were swimming about with their noses barely out of water, then sinking out of sight like submarines, and after a few moments emerging with salmon in their jaws. Skeptics who flew over to disprove the yarn about the snorkel bears, as they came to be called, returned convinced. Among the converts was Mr. Nancarrow, who observed that individual bears displayed varying degrees of skill in this unusual method of fishing. All were successful, he found, although one, less adroit than the rest, tried many times before getting its fish.

During our stay at Brooks River Camp, someone remarked that two brown bears had passed the group of tents in the early dawn, but this event created no excitement. The Griggs party found the bears quick to take flight on learning of the presence of man. Cahalane (1947, p. 146) had the same experience in 1940, as have rangers who were stationed in the area in 1950 and 1951. Nevertheless, one feels when in Katmai National Monument that the bears are the real proprietors and man but a transient visitor. And though it is appropriate to travel quietly in most primeval regions, bears, like people, are annoyed when startled; therefore, when using Katmai's bear trails, a reasonable amount of noise, to give the owners some advance notice of one's approach, seems prudent.

Some Alaskans rattle pebbles in tobacco cans for this purpose; others use bosun's whistles.

Elsewhere in Alaska there is considerable pressure by commercial fishing interests to eliminate brown bears because they eat salmon, and by cattlemen because occasionally individual bears get the cattle-killing habit. But Katmai National Monument affords the bears an isolated refuge where they will benefit an industry destined to be one of Alaska's greatest—recreation.

Wolverines, Beavers, and Other Fur-bearers

Except in the immediate vicinity of the seacoast, the larger lakes, and the Valley of Ten Thousand Smokes, Katmai's wilderness has been so little explored by white men that we hardly know the extent of its wildlife resources even today. Although no surveys have been possible with respect to the mammals, wolverines have been noted, as well as otters, mink, and Arctic foxes. In addition, sea otters and fur seals have been reported in the neighborhood of the offshore islands.

For the first twenty-two years of the monument's existence, fur-bearing animals received little or no protection because of the inability of the National Park Service to obtain funds for the establishment of ranger positions. Fish and Wildlife Service law enforcement agents made patrols when they could, but in the early years a shortage of air transportation rendered it difficult even for these officers to make surprise visits. In 1940 National Park Service officials found poaching of fur-bearers to be openly carried on in the monument.

However, as better air transportation developed, poaching declined. The detail of a National Park Service ranger for two months each year, commencing in 1950, is a step toward making the monument the wildlife sanctuary that it was intended to be.

The swampy forest lands where Katmai's beavers live are as yet so unexplored and trail-less that we cannot say how many of these animals there are. But from the air their ponds and houses can be seen fairly often. In the forest near the mouth to the Brooks River, and only a few minutes walk from the fishing camp, is a small lake formed by a beaver dam three-quarters of a mile long, eight feet high, and twelve feet wide at the base. Large cottonwoods growing up through this grass-grown edifice indicate its comparatively great age and lack of disturbance by man. Whether or not this dam is of record-breaking size among the countless great beaver dams of the far north is uncertain. But its broad crest makes an impressive and appropriate walkway through the tranquil, green solitude.

Moose and Caribou

The eruption must have killed many moose and caribou directly, but the secondary effects resulting from the smothering of their food supply have been more destructive and permanent. Griggs reports (p. 314) that large numbers died when their teeth became worn to the gums by the abrasive dust that coated the surviving vegetation.

However, the National Geographic parties found both moose and caribou beginning to return as the ash became stabilized. Not enough exploring has been done in recent years to determine the numbers of either species, but moose obviously are common in the interior section of the monument. Even in the Valley of Ten Thousand Smokes the recovering vegetation has begun to supply forage for these animals.

Swans and Other Birds

Katmai National Monument's wealth of forests, swamps, lakes, lagoons, bays, islands, alder thickets, grasslands, and open beaches makes the region a haven for birds. Ninety-two species have been recorded in and around the monument during the relatively brief explorations so far made, and, of this total, water birds comprise more than half. These explorations include studies of bird life in 1917 and 1919 by James S. Hine of the National Geographic party and in 1940 by Victor H. Cahalane of the National Park Service.

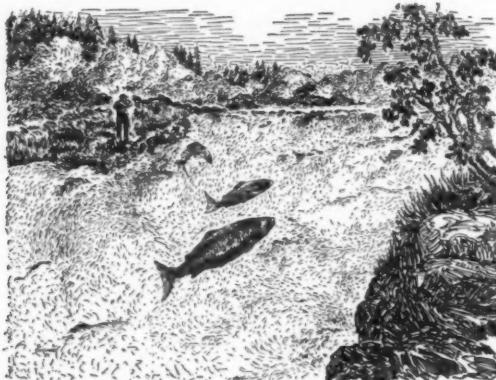
Griggs (p. 313) saw one flock of whistling swans estimated to number five hundred birds, and in 1940 Cahalane (1944) observed several flocks and family pairs in the Katmai region. There are eighteen species of ducks, some being abundant, and fourteen kinds of shore birds. Spruce grouse were found to be numerous by Cahalane (1944, p. 364) in the forest north of Mount Katolinat; and two species of ptarmigan are present. Those who are concerned lest the American eagle may be decimated in Alaska can take some comfort in the fact that these birds are still numerous on Katmai's long coast line and spacious inland waterways. In the spring hundreds of nesting gulls fly anxiously from grassy islands in Lake Naknek's Iliuk Arm, and from the Bay of Islands, to meet the human visitor. Circling gracefully overhead they utter their wild and plaintive cries.

The Great Fish

Katmai has been known to some Alaskans as an angler's paradise ever since the early National Geographic Society expeditions reported that the rainbow trout averaged two feet long, with some fish measuring up to

thirty-two inches. In addition to the rainbows, there are grayling; and eight-to-ten pound mackinaw trout provide fine fishing in the lakes. During World War II many plane loads of military personnel came to Katmai's lakes to fish. How many thousand trout were taken never will be accurately known, for the National Park Service was unable to station a ranger there at the time. Though still excellent by state-side standards, the fishing here, as in much of Alaska, has not yet recovered from the wartime's heavy drain.

Even if you are not a fisherman, you can hardly fail to be impressed by the salmon leaping in endless procession up and over Brooks Falls in



its spacious forest setting. Almost every second during the height of the spring runs, the big, shining, elegantly-proportioned fish shoot into the air from the boiling white water at the base of the falls. Often two or more are in the air at one time. So great is the velocity of the water that the outcome of almost every arcking leap appears in doubt as the taut, fighting creatures, landing barely upon the foaming lip of the falls, struggle desperately against being carried down over the brink.

Though great numbers win their way over the crest, others fail and are dashed upon the rocks below. But fishermen need not deplore this obstacle, for such hurdles are nature's age-old device for insuring that only the most vigorous and indomitable shall reach the spawning grounds to pass on their fighting qualities to future generations.

4. Wilderness in Transition

THE VALLEY of Ten Thousand Smokes quiesces and a crater sleeps. But in the valley pink cliffs emerge, sculptured by wind and water, and a forest slowly reappears in the canyon depths, while Martin Volcano stands smoking behind it. In Katmai's crater a green lake gradually rises. Shining glaciers are born in a shelter new to the world, and the crater becomes ever more beautiful. Across the monument another crater lake is revealed, older, brimming with water of a different hue, its place in the sequence of Katmai's unfolding story yet unknown, a challenge to science and to the imagination of all who love the wilderness. The wildlife returns to take up an old claim.

Nature is never static. Katmai's smokes are reduced in number, but though the old wonders change, they are not lost. Their story remains, written on the land itself, where all can read; and it is ever unfolding.

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Stories at Evening

My great great grandpa Pethro walked
The wild savannahs deep in grass;
He saw the herds of buffalo
File westward through the mountain pass.

Great grandpa William in his time
Remembered pigeons wild and gray
Whose thousand wings beat out the sun
The morning that they flew away.

My grandpa Frederick could recall
The wild trout flashing in their school;
He set his stick of dynamite
And scooped a hundred from the pool.

My father, Douglas, saw the trees.
Across this bare, eroded land,
He saw the tulip tree and ash
The spruce and hemlock—virgin stand.

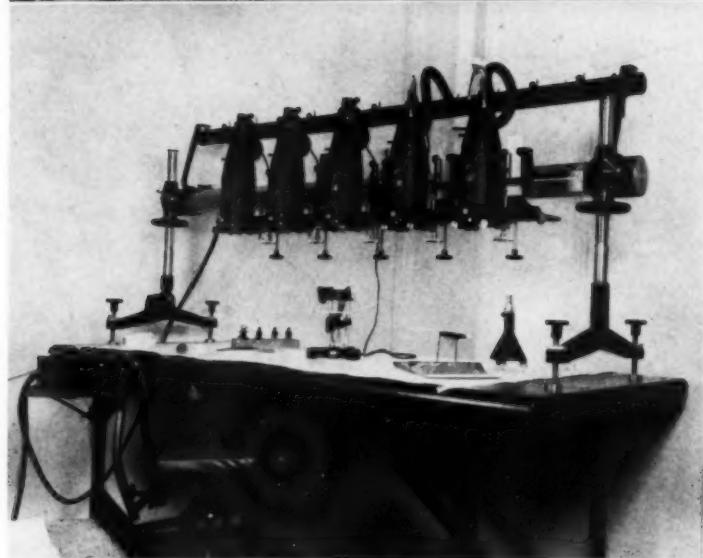
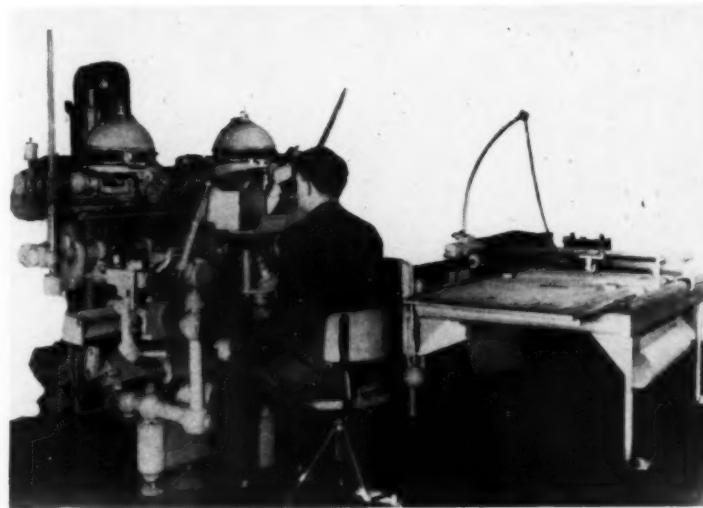
And I myself at morning saw
The chestnut on the ridge—its living green—
The blue-fringed gentian. "Listen, now, my son—
Stories at evening—wonders have I seen;
And, as we sit, look sharp and well remember—
Your son may hear the strangest tale of all;
How little rabbits hopped across our garden,
How *grass* grew by the wall,
And there, one night, when you were six or seven,
You heard a Bob White call."

LOUISE MCNEILL

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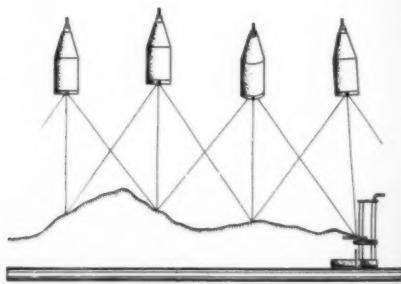
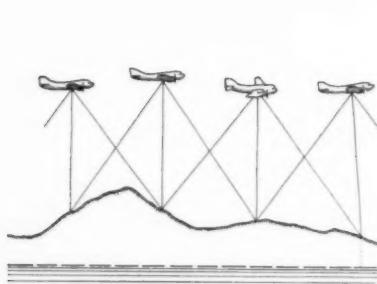
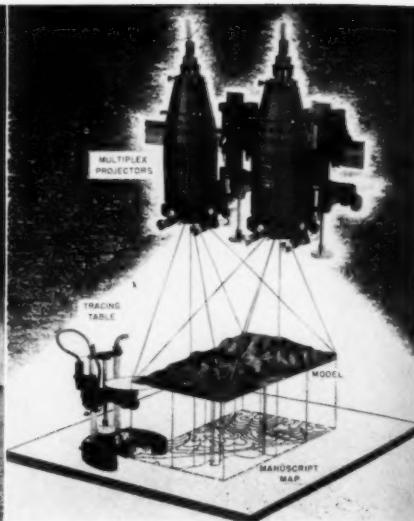
MODERN TOPOGRAPHIC MAPPING

Photos by U. S. Geological Survey



1. The Stereoplanigraph, a German stereo-plotting instrument capable of producing maps of high precision. The two overlapping diapositives are placed in the half-dome-shaped projector at the top and the map is plotted by means of connecting arms on the table at the right. The three motions necessary are produced by the two handwheels and the foot disk. The right foot is absolutely free.

2. The Multiplex Aeroprojector is used by the U. S. Geological Survey for plotting most of its topographic maps; however, the Survey owns a number of the other principal plotting instruments which are also active producers.



3. The Tracing Table. The stereoscopic model is seen on the white platen, and the floating mark appears in the center as a white dot at the intersection of two railroads. As the floating mark is moved about the drawing board, the model seems to remain, of course, in its "fixed" position.

4. The stereoscopic image is projected in complementary colors of red and green. When viewed through spectacles of corresponding colors, a clear-cut model appears, seemingly made of modeling clay. The contours, watercourses, railroad, etc., are projected onto the map paper by means of the tracing table.

5. The position of each projector is adjusted to represent, to scale, the exact position of the plane at the instant the photograph is taken.

6. Co...

Instead
minutes
(note th...



6. Contact is made several times a day with the observers on the mountaintops, and party chiefs can return to base headquarters at intervals for conferences.

7. Helicopters enable triangulation parties to take immediate advantage of a break in the weather. Instead of hours of arduous climbing, sometimes futile, the party arrives on top within a matter of minutes and in fresh physical condition. Occasionally the party has to stay several days on one station (note the tent). When work is completed, a walkie-talkie call brings the helicopter back on short notice.



8. This modern triangulation party consists of observer, recorder, and helicopter pilot. The plane table and alidade are used for making quick, approximate locations of new points, for determining just where to look for such new points from other stations, and for checking vertical angles.

9. The new and the old in theodolites. The first, of foreign manufacture, weighs about one-third as much as the older type and has supplanted it for U. S. Geological Survey triangulation.

Modern Topographic Mapping

By KOSTKA MUDD

*Cartographic Engineer, United States Geological Survey**

THE OLD TOPOGRAPHERS of the Geological Survey might not have been fired with George Leigh Mallory's enthusiasm for mountaineering, but they had to climb mountains anyway, and for the very same reason. The mountains were there, and climbing them was necessary because there was no other way to map mountains. And when we remember that some of the Survey's "mountain men" used to map a thousand square miles of the High Sierra country in a single short season, we are inclined to forgive a few discrepancies in the heights they determined for some of the peaks.

Things are different now. The period between the two world wars witnessed the beginning of a new and revolutionary era in topographic mapping—the development of aerial photogrammetry as the principal means of contouring the earth's surface.

American topographers first became interested in the possibilities of aerial photography as a result of its use in World War I to record the installations and day-to-day movements of the enemy. The up-to-the-minute revision of battle maps from information thus obtained was the duty of the 29th Engineers, nearly one-half of whose officer personnel of ninety-eight was comprised of topographers from the Geological Survey. Close contact with this kind of map revision fascinated these former topographers, and after the war, they returned to civil life imbued with ideas about mapping from the air. These ideas led to experiments, and the many encouraging results obtained soon convinced the more progressive leaders in mapping organizations that photogrammetric mapping was here to stay and would sooner or later supplant the old methods of sketching contours. Never again would topographers have to climb mountains in order to see the country. The airplane would do the climbing and the camera the looking.

Up to this time topographic mapping of mountainous areas had been carried on in much the same manner as were the old exploratory surveys of the Hayden and Powell eras. True, much progress had been made, but for the most part it was due to refinements in instruments, standardization of methods, and more intensive surveying practice. The topographer still had full responsibility for every phase of the work from the initial

* Publication authorized by the Director, U.S. Geological Survey.

search for data and the plotting of the projections to the final inking of the manuscript. One familiar with the work of the several topographers could tell from a glance at the name appearing at the lower left hand corner of a sheet how much dependence could be put on the contours and elevations of that particular map. One could also get a pretty good idea of potential weak spots in any map by searching out areas that appeared to be practically inaccessible.

With the advent of aerial photogrammetry (meaning, literally, measuring on photographs), mapping became a highly specialized activity with divided responsibilities. At least seven major operations, under the charge of as many separate units or sections, are involved in the mapping of a quadrangle today. Furthermore, some of these seven operations are subdivided so that many more items of individual responsibility may be involved. It is regrettable that much of the pride of creation induced by individual responsibility has been lost forever, but the expanded needs for maps in this generation of mighty builders could never be met except through mass-production methods. Besides, this pride of creation was too often directed toward artistic appearance rather than consistent accuracy.

As a matter of fact, consistent accuracy was never entirely possible with the old methods because inaccessible regions had to be mapped from peaks several miles away. On the other hand, the aerial camera is not troubled with difficulties of foot travel; it sees into every nook and cranny from its vantage point in the sky. As a result, consistency to a degree never dreamed of has been attained in mapping rough terrain and inaccessible peaks. This has permitted the establishment of standards of map accuracy, and a statement showing compliance with these standards is now printed on all maps that pass the tests provided.

The actual use of photographs by the Geological Survey started in the early twenties. The first maps compiled were planimetric, that is, they were "flat" maps showing only culture (works of man such as roads and houses), drainage lines, and woodland. Contours were still added by field methods although greater consistency was insured through having the planimetric data in proper position on the field board. The planimetry of flat country could practically be traced from the photographs, but changes in elevation induced changes in the scale of the photographs and this was further complicated by tilt of the camera. A graphic method of intersecting controlling points from the centers of two overlapping photographs was devised to correct scale differences. This was called radial triangulation. Where tilt was nominal, results were very satisfactory even in regions of considerable relief. Several states, notably Louisiana, Michi-

gan, and Wisconsin, coöperated with the Geological Survey in financing planimetric maps of unsurveyed flat areas because they had neither the funds for contour maps nor the time to wait for them. Some of these maps still represent the only maps available of certain areas.

In the early 'twenties, photogrammetric instruments began to appear on the market. These were mostly of German origin, although Bröck & Weymouth in Philadelphia developed a home product, camera and all, and did considerable mapping by contract. The aerocartograph came out in 1920 and the stereoplaniograph (fig. 1) in 1923. The Geological Survey acquired an aerocartograph in 1928.

These first German instruments were capable of very precise work, but they were bulky and rather too complicated and expensive for general use. However, about 1934, there appeared on the market a new German instrument that seemed to be designed especially for Geological Survey requirements. This instrument, the Zeiss Multiplex Aeroprojector, employed the principle of simple projection of small glass disapositives made from the original negatives.

The Geological Survey purchased its first multiplex in about 1935. At that time it was coöoperating with the Tennessee Valley Authority in a large program of topographic mapping, so the new instruments were sent to Chattanooga, and the whole Tennessee Valley served as a proving ground for the multiplex and a training field for operators. Additional units were purchased, operators were put on a two-shift basis, and by 1945 excellent topographic maps covering at least one-third of the 40,000 square miles in the valley were ready for distribution.

The multiplex is a stereoscopic plotting instrument and its virtue for mapping lies in its utilization of a stereoscopic image of the earth's surface formed by viewing pairs of consecutive aerial photographs, much after the manner in which three-dimensional images were formed with the old-fashioned parlor stereoscope by viewing two pictures of the same object taken from different camera stations. In order to provide a stereoscopic image of any portion of the terrain, two views of it must be taken from camera stations some distance apart; that is, from different positions of the photographing plane along its flight course. In actuality, this is accomplished by spacing the exposures so the photographs will overlap somewhat more than 50 per cent in the direction of flight. Each photograph is then paired with its overlapping neighbor to produce the stereoscopic effect desired.

The multiplex (fig. 2) consists of a number of projectors mounted on a bar supported by adjustable legs on a smooth-top, rigid table made of

slate or reinforced aluminum. Free to move about on this table is a small gadget, called a tracing table (fig. 3), which has a circular white platen with an illuminated dot at the center and a pencil directly below the dot. Each projector can be moved, tilted, and rotated, and the platen has a vertical motion which can be measured.

The original negatives are first reduced to small diapositives similar to magic-lantern slides. Two of these slides, made from overlapping negatives, are placed in adjacent projectors, as in figure 4, in which are also inserted red and green filters. The two colored images may then be projected onto a sheet of white paper or the tracing-table platen, and a stereoscopic image can be formed by viewing the overlapping images through bicolored spectacles of the same complementary colors as the filters. If elevations are available for four well-distributed image points in the overlapped area, it is possible to make each projector assume the exact inclination and relative position of the camera at the instant of exposure, as is indicated in figure 5. The two projectors in connection with the stereoscopic model will then form an exact, small-scale model of the two positions of the camera and the surface of the earth below (fig. 4). By moving the platen up or down until the illuminated dot appears to touch the ground at one of the image points for which an elevation is available, we can establish a corresponding scale reading for that elevation. If the platen at this point is one foot below the projectors, and if the photographs were taken from a height of 12,000 feet above this particular elevation point, then we should have a scale relation of 1:12,000, or one inch on the model to 1000 feet on the ground. From this it is easily seen that a movement of 0.01 inch in the height of the platen would mean a difference in elevation of ten feet on the ground.

The top of the scale table serves as a reference or datum plane above which the vertical distances (elevations) are measured. For this reason it must be a nearly perfect plane. Actually, the slabs are true to within 0.002 inch of absolute level. According to the relation mentioned above, this would mean less than two feet in actual ground elevation. The slab also serves as a plotting board and there is fastened to it a sheet of drawing paper on which the map is compiled.

When first viewed, the stereoscopic image is a rather startling thing to behold. The complementary colors of the filters and spectacles merge to a dull gray and suddenly there appears a clean-cut model which gives the impression of being made from modeling clay. It looks just as real as the one in figure 4. It exists, of course, only in the mind, and when the observer instinctively reaches out to touch it, he pokes his finger through a moun-

tain! For this reason it is sometimes called the phantom model. More common designations are stereoscopic model and spatial model. One may touch the point of a pencil to the apparent ground surface of this model and, by moving it horizontally while maintaining contact, trace an imaginary contour around the points of ridges and in and out of the recesses of drains; but, of course, there will be no record of it left. However, the tracing table provides the means of tracing such imaginary contours accurately and projecting them as actual lines onto the map paper below. When this table is moved around, the illuminated dot will appear to float over valleys and low spots. This explains why it is commonly referred to as the floating mark. When moved into higher ground it seems to dig in. By moving the platen up or down to a graduation that corresponds to a contour elevation on the ground, then shifting the table until the floating mark just touches the apparent ground surface, we arrive at the location of a point on that particular contour. This point can be projected to the map paper simply by lowering the pencil. The table may now be pushed along the ground surface with the dot always in apparent contact and the pencil will record the movements on the map paper in the exact shape and position of that particular contour. Conversely, the floating mark may be brought into contact with a definite image point on the model, such as a road fork, and an elevation for the corresponding ground point can be determined very simply from the reading on the vertical scale. Planimetric features, such as roads and streams, may also be accurately plotted by continually raising or lowering the floating mark to keep it in contact with the surface while the feature is being traced.

The need for ground elevations was implied in defining scale relations. Accurate elevations must be obtained for at least four points on each model. This work is called supplemental control because it is additional to the basic control normally obtained for mapping operations. These points are selected by the control planner and elevations are obtained in the field by a supplemental control party. In addition to these vertical control points, a few horizontal control points are necessary to hold the model to exact scale and to place it in exactly its proper position on the map. The multiplex simplifies this problem because a whole battery of projectors can be assembled along the bar to simulate a flight strip of photographs. One horizontal control point near each end of such a strip will ordinarily serve to hold the scale and position of each individual model. For long flights, ten miles or more, an additional point near the center is usually required. While the battery of projectors is in position, location dots corresponding to the four elevations in each model and the

photo centers are transferred to the map paper for later use in tying individual models to their proper positions.

The necessity for ground control and, later, for field examination of the maps, effectively blocks the complete conversion (an old-time topographer would call it degeneration) of exploratory mapping into an arm-chair occupation. Good mountain climbers are still in demand when rugged peaks must be occupied by the triangulator to read horizontal and vertical angles to signals built on other points of vantage. But even here progress rears its ubiquitous head and occasionally a sort of horizontal windmill is seen flitting from point to point. This means that the dream of many a topographer has come true, and we now have helicopters that can transport a triangulator to his station in as many minutes as hours would be required on foot.

A truly marvelous complement to this rapid transportation, and an invaluable aid for large triangulation parties, is the portable two-way radio. In Alaska, where these two devices have had the most use and are, undoubtedly, most needed, improvement in results has been spectacular. They have been used in Colorado, in Washington, in Nevada, and on the Death Valley project in California.

There remains, however, at least for the time being, one solace for the enthusiastic alpinists of California: the present ceiling for helicopters is usually under 9,000 feet. At that elevation the ship can land but must park near the edge of a cliff so it can take off by sliding out into space. In the mapping of the upper Kings River Basin last year, the radios were used in connection with an electronic device for measuring distance. But among the 11,000-foot peaks of that rugged, primitive area, the helicopters were missing. Rapid transportation was provided by pack mules and shank's mare.

Wilderness and Man

By CHARLES C. BRADLEY*

THE AMERICAN FRONTIER, we are told, was a powerful factor in the shaping of American culture. In the space of time which saw the migration of that frontier from the Appalachians to the west coast, America has grown from a thousand or so colonists to a nation of 160,000,000 with an accelerating population growth. It has altered the nature of human activity from grubbing stumps to a diversification and specialization distressingly complex to say the least.

As this modern America smacks its lips and prepares to take the last bites in its banquet on fresh wilderness—the last of such bites man shall ever take—it is possible to discern a growing interest in the preservation of some of the remaining primitive country. Justice W. O. Douglas writes a best seller called "Of Men and Mountains." Aldo Leopold writes a beautiful collection of soul-searching essays entitled "Sand County Almanac." We hear of a nation-wide battle in which the Nature Lovers try to preserve Dinosaur National Monument from the "predatory" Bureau of Reclamation, and at the same time we hear of a women's club in a midwestern city waging a lesser battle to preserve the yellow lady-slipper from the predatory dairy cow. Organizations like the Wilderness Society and the Audubon Society spring up and grow in strength as wilderness and wildlife diminish to the vanishing point.

Man has wrought great changes on the surface of the earth. Perhaps the most profound change and the one most symbolic of his activity is that of paving. Today, I have been told, approximately 2 per cent of the area of the United States is paved. At the same time our total untouched wilderness area has dwindled to about this same figure. So while the unaltered and completely altered areas balance each other, perhaps it is appropriate to examine this problem of wilderness preservation. Certainly if wilderness possesses any cherishable value or ingredient necessary to our welfare, it is none too soon to raise our voices. Even those wilderness areas we have set aside by law "for the enjoyment of all people" seem to be yielding rapidly to the utilitarian lobby from without and the trampling by sheer numbers of appreciative users from within. So we can ill afford complacency at this point if our honest desire is to save wild country from complete obliteration.

The purpose of this paper is to search the proposition of wilderness

* Paper presented at Montana State College Faculty Forum, January 17, 1952.

value to see if such values are real, whether they are great enough to be worth preserving, and finally, whether they can be preserved. I think they can, but as with so many of our problems, we will have to want to solve this one before it will be solved. Hence, it becomes an additional purpose of this paper to propagandize an already over-propagandized group in the hope of stirring up physical action toward a high end. If no action follows the paper, then, regardless of its other merits, the paper is a failure.

What, then, are these so-called wilderness values? What did the wilderness give our fathers on the frontier? What can it give us today that we can't get some other way?

Most of the benefits which accrued to the nation as wilderness retreated are so obvious as to need only listing. There were quantities of fresh soil for agriculture, tremendous supplies of lumber, rich and extensive mineral deposits for industry, fish and game for the belly and for sport. These we have had, and now as the frontier moves to the end, agriculture, forestry, industry and sportsmen turn to look over their shoulders at the alterations to their rear, and we are shocked into a new era where "conservation" is the watchword and "preservation of our way of life" is the cry. With half an eye one can see that our old way of life was geared to the consumption of wilderness and with the end of wilderness comes the end of that way of life. These, then, cannot be the values we seek to preserve by retaining wilderness, for they are by nature transient and dependent for their existence upon a retreating wilderness.

What values can we derive from non-retreating wild areas? Since we are well into the Conservation Era these values have been stated many times and sound quite familiar. Wilderness for studies in forestry, botany, geology, fish and wildlife, ecology, game management; wilderness as a control area in studies of land usage; wilderness as watershed or to preserve some scenic feature; wilderness for camping and picnicking. It may be seen that these values fall into three categories, the scientific, the conservative, and the recreational.

Wilderness for Science

The scientific value of wilderness stems from the recognition that man's surface activities have so confused and upset rock, soil, plant and animal relationships that we need a few untouched control areas in order to determine precisely what man *has* done. These studies will better guide him in his future activities. Without these controls our natural and earth sciences tend to hang in space where their opportunity to lend a hand in

man's struggle is strictly of the moment and in the nature of expedient. To be assured of this value of untouched areas one need only hear the mid-west soil scientists complain bitterly that there is no typical piece of prairie left for them to study, or one should see the pollution experts groping for answers in a region that has no such thing as a clean stream. We have waited over-long to set up our controls. Shall we wait longer?

In our effort to obtain the long view, wilderness, being the base from which man sprung, is hence the fundamental viewpoint for our observation of the progress of civilization. The lack of such viewpoint leads to such statements as one I recently heard from an eminent educator, "America is a nation which has not yet expanded to its resource base." I submit this statement is meaningless. It implies that we know the population figure which the area of U.S. is capable of sustaining on a permanent yield basis. We have no such knowledge. In fact, we have only barely started the struggle to obtain the basic information necessary to give us this knowledge. And even when we get the answer there is every indication that the figure will *not* include our present standard of living as one of the qualifications. Just now our ideas of the limits of food supply are muddled by the sort of confused thinking which forgets that commercial fertilizers are either finite mineral deposits or are manufactured by the liberal expenditure of finite mineral fuel deposits. It would not surprise me if this whole question of sustained population, and not the atomic bomb, is the real \$64 question for our civilization. At the moment, we are as capable of getting ourselves into a population trap as the deer and the Chinese.

The scientific value of wilderness areas is therefore in the nature of a long term value for which there is no substitute.

Wilderness and Conservation

The conservation value of wilderness is perhaps best exemplified by the reservation of wilderness for watershed. This can be called an immediate action step toward the solution of a soil-water problem which has developed with the advance of our civilization. The protection of our watersheds is one thing we can do to help correct the interrelated problems of soil erosion and loss of fertility, flood control, pollution and water shortage. Here we merely refresh in our minds the oft-stated principle that Nature is fundamentally conservative and that we not only can utilize this to our advantage, but we can best learn some of the principles of conservation in areas undisturbed by man. It is time we gave up the childish concepts that the local price of real estate represents the value of land,

and that the monthly water bill represents the value of water. Having a few wild areas around may help us reorient our sense of values regarding these things. If there is a substitute of equal value for wilderness in this capacity no one has yet found it.

It is vital that the lay public and in particular the big hyperthyroid public utilities clearly understand the two values just discussed, Wilderness for study and conservation. The impression is strong upon our people that the scientists have all the answers (or will have, day after tomorrow) that we can continue to hurtle along in the direction we are going, confident that the clear eye and steady hand of the scientist is at the controls. They should know that for our present velocity the headlights of science are simply incapable of illuminating the route ahead with anything like the brilliance we would like if we are to avoid trouble. Study of wilderness areas can help serve as a gyro to keep us from getting out of control or off the beam.

For the above reasons alone it appears to me quite patent that to remove wilderness from the face of the earth, or, which would be effectively the same, make it by virtue of distance, unavailable to students, would be at best short-sighted and at worst an invitation to disaster.

Wilderness for Recreation

The aspects of wilderness value just discussed are easy to talk about and by themselves make a strong case for preservation. I will not deny the use of their argument to help rationalize the preservation of a few wild areas for the spiritual content they hold for me and a few others. This is a subject more difficult to discuss and a still more difficult one on which to build a coldly logical case. Here, instead of arguing that wilderness has a dollars and cents value for the masses, I am saying that wilderness has a non-economic value for a small minority. Until we honestly recognize the spirit as a real and important component of the individual we will always feel embarrassed to fight boldly for spiritual values. Instead, we will use subterfuge. We will search desperately for a monetary price tag and then try to mark it down like a clearance sale in hopes the public will come clamoring to the counter.

As Nick Helburn so nicely puts it, "We must be careful in our effort to obtain the things that men live by, that we don't lose the things that men live for." I am going to argue the recreational case for wilderness because I am one of the many who believe that in the long run it is the idealist who is the most hard-headed, practical man.

The word recreation as used today encompasses almost everything in

which man finds pleasure. This includes the gamut from Sunday worship to a four-day binge with a variety of activities, some worthwhile and some approaching depravity. As such, recreation becomes almost a meaningless term. So I shall limit the term rather sharply to those wilderness experiences which uniquely tend to renew the spirit. This would probably exclude most hunting and fishing which, except for a few indirect values, appear to me to pertain either to the satisfaction of the belly or the inflation of the ego. Nor would I include the large and noisy picnic gatherings, for these by their very nature tend to exclude wilderness from the consciousness of the individual, who could get the same social value from a house party.

I will not try to separate the spiritual experience from the aesthetic nor from the intellectual. As man becomes more and more an intellectual being it is obvious that his spiritual experiences are going to depend more and more upon his intellect. One cannot deny the satisfaction of the spirit which comes from the solution of a knotty intellectual problem. A polluted stream not only offends our aesthetic sense and depresses the spirit but intellectually we see it as an indication of something terribly wrong. The spirit, more often than not, has the correct intuitive perception of rightness and wrongness which the intellect could well heed and investigate. The real danger is that we will try to separate these facets of man instead of letting them operate as a functioning unit for a more perceptive life.

Spiritual harmony in the individual is a reflection of his sense of adaptation to his total environment. It has three discernible components. Harmony of the individual in relation to himself; harmony of the individual in his relations with his fellow men; harmony of the individual with respect to the rest of his environment, mainly the earth and its biotic community. In the beginning, man's adaptation was instinctive and as such, was probably no worse nor better than that of other animals. Like the deer, he had fears, but they probably didn't give him ulcers. He fought for security but probably didn't have a nervous breakdown because his security was imperfect. In addition, he was probably not too introspective nor did he have much need of other men.

The *instinctive* viewpoint presents a poorly illuminated picture of total environment while the *intellectual* viewpoint brilliantly illuminates a small sector of the total. As man has evolved and shifted his viewpoint from the instinctive to the intellectual, while he has gained in depth of perception, he has lost his sense of the total. This narrowing has made him as an individual exceedingly vulnerable to disaster. As a result, feeling insecure, he gathers around him other men. On the breadth of their

collective viewpoint plus the added depth of the intellect, man has now staked his future. His adaptation from now on out depends upon the success of the scheme we call civilization.

But the advantage of the civilized position was in part negated by the sudden introduction of a welter of problems arising from the enforced close association of man with man. This has necessitated a great intellectual effort on the part of all individuals to harmonize man-to-man relations which in turn has necessitated a fair amount of introspection and self analysis. It is not surprising, therefore, that these large immediate problems have caused us to neglect our man-earth relationships.

That this is true is reflected in our ethics and our education. Our ethics which can be summarized by the golden rule, deal only with man-to-man relations. There is no counterpart to guide us in our relationship with other animals, with plants, with soil, with water. Yet, in the final analysis, are these less fundamental to our existence?

We set aside libraries and museums with public funds. These institutions display and protect the treasures of man. You will argue that we have also set aside national parks to protect and display a few treasures of nature. But the wide difference in our attitudes toward each reveals our civilized myopia. No one in his right mind would suggest that Bozeman Library do double duty as a bus terminal on the ground that it would serve more people, yet very few persons turned a hair when the Secretary of Interior proposed that the wild canyons for which Dinosaur National Park was set aside be completely inundated by a Bureau of Reclamation power project, on the grounds that *it* would serve more people. No one would suggest that a library have a bar and juke box but these may be found in several of our national parks or crowding their fringes. No good citizen would write his name in three-foot letters on the wall of a museum, yet many an otherwise good citizen has done just that on the canyon walls of a National Park.

We have neglected our man-earth relationship. That the spirit suffers is reflected in the million rubber tired wheels that roll out of the cities on weekends and vacations, in an ever-widening search for a small patch of "country" in which to renew the spirit. Some find a partial answer in gardening, birdwatching, farming, or natural science, but the millions of feet trampling the National Parks to dust are mute testimony that we need more, not less wilderness to slake the thirsty spirit of man.

We sadly need a land ethic.* Life is in a large part a competition for

* Term introduced by Aldo Leopold meaning an ethic regarding the earth, soil, water, and biota.

energy. Our intellect has taught us how to utilize a small dividend of stored solar energy—the mineral fuels. This gives us tremendous though temporary advantage over the other forms of life. At the moment we hold the destinies of all plants and animals in the palm of our hand. We can live with them or we can wipe them from the face of the earth, as we see fit. We decided (by default) to obliterate the passenger pigeon; we decided (at the eleventh hour) not to obliterate the buffalo. It's as easy as that. Such a powerful advantage demands an equally powerful ethic or we become irresponsible and whimsical agents of destruction—vandals on the face of the earth. It is a fair bet that our ethical sense will evolve in the future as it has in the past and that it will be extended finally to the earth and all its inhabitants. Just now few men will admit animals (other than human) have any rights.

Until we extend our ethics to the earth the spirit will suffer, for it is the intuitive warning that all is not right, and that it is time for the intellect to take a few more steps. The preservation of wilderness is a good first step in a land ethic, for by it we concede the possibility that other forms of life have at least the right to live, and it gives us time to focus our intellect on the problem.

Wilderness is not the only device to renew man-earth contact but it is potentially one of the best because it allows us to go all the way back to man's beginnings, giving us a more profound sense of history than would be otherwise possible. This is food for the intellect and the spirit alike. But unfortunately it is unavailable to many people, not so much because of distance as because they have been so long removed from wild things that they have no knowledge of *how* to approach it. Its unfamiliarity scares them so they come in large groups, make great noises and drag the familiar trappings of civilization with them to make them feel at home. Movies, hotels, dances, and the ubiquitous bar. Gone from them is the wilderness and with it the opportunity for spiritual self-renewal both for themselves and for those within a radius of miles. The spirit points the way but the intellect recoils in fear.

How can we reduce our fears of wilderness? How can we subdue our ego and approach it humbly for the spiritual and intellectual food it holds for us? It achieves less than nothing if we set aside areas only to have them unused, or vandalized. As with our libraries and museums the wild areas will probably only be used and appreciated by a small minority, but in the light of the cultural health of our civilization they are certainly worth the small price we pay. That price is principally a self-imposed restraint—the decision *not* to obliterate wilderness entirely. The remain-

der of the price is the necessity to give our children a chance to learn how to approach wilderness, how to extract its benefits and yet leave it unchanged for others. This last is not easy now because we have left so little wilderness and so many people wanting to use it. But it can be done. I watched 150 Sierra Club members break a camp which they had occupied for two weeks. You hardly would have known people had been there. The fireplaces, bed and tent sites had disappeared and a covering of pine needles had been scattered back over all the disturbed spots. The tin cans had been carried out to civilization on their backs. Absurd, you may say, but it reflects a rare degree of sensitivity to wilderness values. You tell me what a camper does with his empty cans and I will tell you the level of his wilderness education.

We have never yet lost by self-restraint nor by education. We have lost much and often by their lack. I say the price for wilderness is worth the effort. What better immediate returns than the kind of companionship that emerges between father and son in the woods? What better long term value than a balanced appreciation of self, of other men, and of the earth, which can be found most easily in the absence of civilized complexity? We learn best by experience but the wilderness is almost the only place left where that is possible. The tremendous volume of civilized education has necessitated the use of short cuts. We learn now by edict. As Aldo Leopold puts it, in losing our wilderness we are in danger of losing a valuable freedom, "The freedom to make mistakes." In wild country, where cops and professors are absent, the lessons are clear and definite, the rewards and penalties are immediate and concrete.

A Plea for Action

In Bozeman, with abundant wilderness at our door, it is hard to become excited about the problem of wilderness preservation. But we have only to look down stream to the land where the tourists come from to understand why they come. By the same token, a look down stream is a look into the crystal ball on the future of the Bozeman area—unless we choose to act. At the risk of antagonizing you, here are some actions that can be taken, should you so desire.

Tomorrow you could go on record for wilderness preservation by writing your representative, Mike Mansfield, a strong letter asking him to be sure to delete Split Mountain and Echo Park sites from any bill authorizing dams, and to advocate an amendment which will safeguard all officially designated wilderness areas from any similar violation.

This weekend you could get on your skis or snowshoes and start your

kid's wilderness education by taking him for a stroll in the woods with all your senses alert and receptive for what is there, but can be found in no other place.

This year you could throw a little of your weight with some organization like the Wilderness Society which is putting up such a grand sustained intelligent battle for this small cultural heritage, our wild country.

This paper is too long. I have asked you to listen to a lot of verbiage, and all I really wanted to say was that preservation of wilderness has large enough rewards connected with it to make it worth while. We are losing it steadily, in spite of present and past efforts to preserve it. Finally, it can be saved if we will it so.

Mono Vignette

By MARION RANDALL PARSONS

MOUNTAIN HISTORY written in stone and soil, vanishing glaciers, ancient course of rivers—we Sierrans have long been devoted to the study of these and kindred subjects. Yet it has occurred to me lately that in our fifty years of mountain travel we have somewhat neglected another field, the stories of the people who blazed our trails. That, unhappily, is an omission that cannot easily be remedied. Early records are hard to find and the people who could confirm or dispute them are virtually all gone. For example, with the death of an old miner known as "Red" at Mono Lake a few winters ago, almost the last direct link with the district's early days was broken. Red had witnessed the burial of Kit Carson's daughter and the planting of the big cottonwoods that now surround her grave near the lake shore. His cabin near by, and another close beside it, are the only buildings now left of an early settlement which preceded even Hammond's Post Office and store.

Mono's mining history has been so admirably covered by Carl P. Russell* that there is no need for me to recall facts and dates. Happily so, it may be, for my Mono is preferably a no man's land, half way between fact and legend, where color and atmosphere all too easily usurp form and substance—a mirage land, perhaps.

The Mono Basin has fascinated me since I first saw it from Mount Dana in 1904. On that July day a high wind tore across the summit crest. We could barely hold our footing against it and our eyes, almost blinded with tears, could spare attention only to the step that lay ahead. So when we sank at last behind the highest rock shelter and looked eastward, the desert country broke upon us like a revelation. Mono Lake was a sheen of silver. Opalescent clouds hung above it, here and there shedding the narrowly local little sunlit showers that I was later to know so well. Desert ranges, the most ethereal blue, stretched before us endlessly. The sense of spaciousness and of the majesty of mountains that I gained that day is unrivalled in my memory.

Eleven years were to elapse before I set foot in that desert country. Elizabeth Witter and I left a Sierra Club party at Gem Lake one July morning, scrambled down the steep trail to Silver Lake and tramped the hot, sand-clogged wagon track to Farrington's Ranch, that milk and

* *One Hundred Years in Yosemite*, by Carl Parcher Russell. University of California Press, Berkeley and Los Angeles, 1947.



UP LUNDY CANYON; INDIAN NELLY'S HOUSE

Mono Country

FOUR PAINTINGS BY MARION RANDALL PARSONS

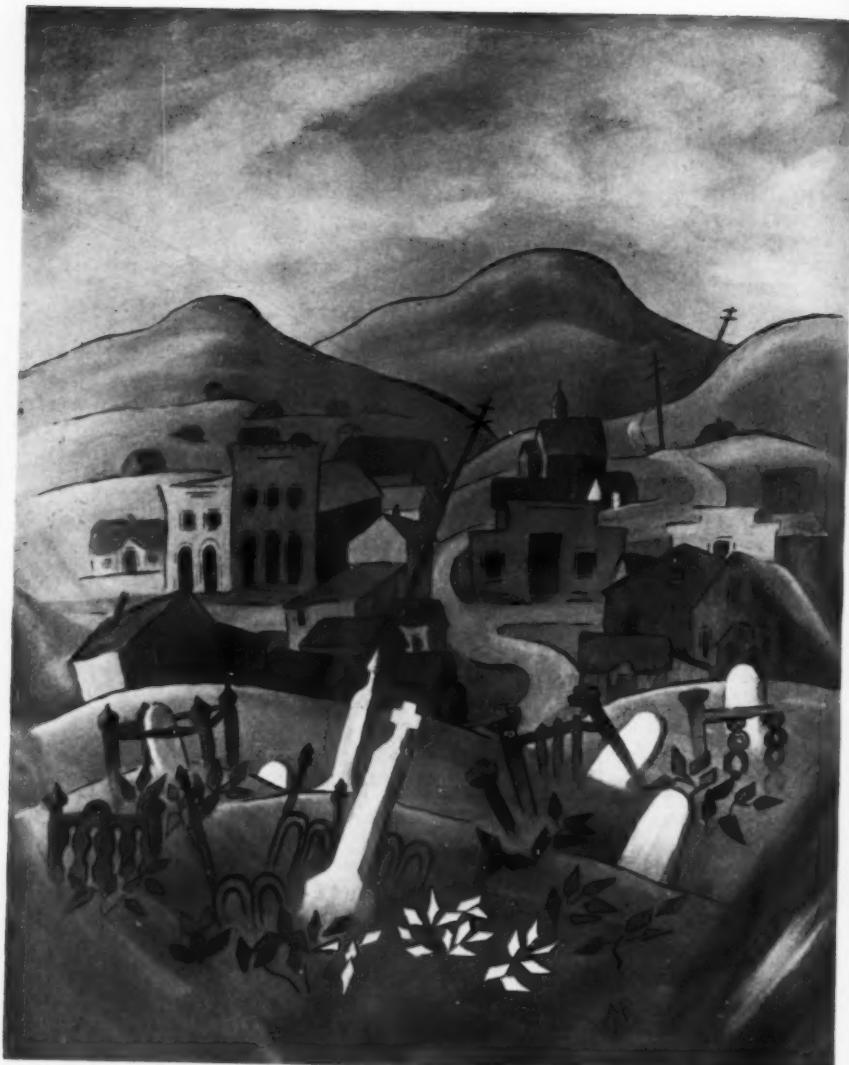


STORM WARNING, MONO LAKE

MAY L



MAY LUNDY MINE



GRAVEYARD AT BODIE

honey and fried-chicken Mecca of many an early Sierran. Tioga Pass was to be opened to motor travel within a week or so, but as yet the "Flatlanders," as Mono people still call us outsiders, had made no impression on the primitive countryside. The beautiful irrigated meadows so laboriously wrested from the desert had not yet begun to revert to sagebrush; the abundant streams had not been diverted to Hollywood's swimming pools; the widely spaced ranch houses had not yet been deserted or turned into tumble-down summer quarters for Basque sheepmen; and the Indians—

The Indians, even a sentimentalist must acknowledge, have benefitted to an almost incredible extent from the changes of these last thirty-five years. In 1915 Mono's Indians lived for the most part in wickups or one-room shanties made of scraps of boards and flattened five-gallon kerosene tins. As Elizabeth and I ended our nooning at Farringdon's and tramped on toward LeeVining Creek, we met a number of Indians. They shuffled by without speaking, their eyes lowered. The women, generally in groups of three or four, wore long, draggled, faded cotton wrappers, shapeless as *holokus*, and shawls over their heads. They were barefooted. Nearly everyone carried a laden basket. The men, even more ragged and dirty, carried nothing and traveled alone.

Even in the early 'thirties, when I myself became a Flatlander summer visitor, these squalid conditions had only begun to improve. Now the Indians own neat new tree-shaded cottages and quite resplendent cars. Their children go to high school and intermarry with the whites. Only a few of the older men and women cling to Indian ways. One of these resents her race's change. "No good, these new Indians," old Nelly bitterly says. "Speak white. Eat white. Think white! No good."

My first Indian acquaintance was Jake, a very old man who leaned upon a hoe occasionally in the potato patch of the farm where my sister and I camped. The meeting ceremonial had been unusual. We sat sketching in the sagebrush one morning, miles from anywhere or anybody we supposed. All at once a voice said, "You mak-a map?" and there was Jake. That ability to materialize out of a vacant landscape boasting neither tree nor rock nor man-size bush was shared by many another Indian of that period we were to find.

Jake was a murderer, we discovered later that day to our no little perturbation, and the reassuring factor that his crime had been regarded as justifiable homicide grew less reassuring as time disclosed more details about Mono's criminal history—such as the case of a man who, after announcing that he meant to kill a certain enemy, went to his home, got

his gun, returned and shot his man before a dozen witnesses. The verdict brought in was accidental death: the man at the business end of the gun was drunk.

Our acquaintance with Jake did not ripen very rapidly. Several summers passed before he accepted us as fellow human beings and consented to sit beside us and talk. He was quite inarticulate and much of his conversation was in sign language. He did not know how old he was, but he could remember his grandfather teaching him to shoot with a bow and arrow. I can still remember the gesture that explained how in taking aim one made allowance for the wind. He told, too, of summer excursions to Tuolumne Meadows with his tribe, to trade Monos' obsidian for the Yosemite Indians' acorns. It was always a hunting trip, he said. They took a long time, camping in one place or another for days till the game gave out. A happy time, except when they had to cross Mono Pass. Of Bloody Canyon Indian superstition had made a dreaded spot. A very wicked wind blew there. "Perhaps not bad for white man," Jake said. "For Indians, very bad."

He tried to tell us of a legendary fish that grew too big for Convict Lake, came to Mono Lake and grew too big for that, and then went to Tahoe to live. The "folk story," never very clear to us, grew even foggier when we talked with Jake the next summer. He appeared in stiff new overalls, a new hat, a clean shirt. "Why Jake!" I said. "What beautiful clothes! You must have worked hard last winter." "No," said Jake. "No work. Tell lies to W.P.A."

Jake is a digression: I am on my way to Lundy, which I also saw first in that year of change 1915. Three of us from the Sierra Club's permanent camp beside the Soda Spring crossed the range again, by way of the Gay-lor Lakes and Lake Canyon to the May Lundy Mine. We did not know, as we traveled the almost obliterated trail in fine August weather, that back in the 'eighties it had been the winter route of Louis de Chambeau, mail carrier from Lundy to Tioga. After the Tioga Mine closed down, never to reopen, and the May Lundy suspended operations, de Chambeau served as winter watchman for both mines. He made his long round from Lundy Lake on skis. Once, caught in a raging storm, he found that his cache at the Tioga Mine had been broken into by wild animals, the food eaten, even his shelter destroyed—and he had fought that storm all the laborious way up Lake Canyon to the divide. There were ranches near the mouth of Leevining Creek, he had heard, though he did not know whether to the north or to the south. He skied down the gorge, nonetheless, the first known to have ventured it, and safely reached Farringdon's.

We found the May Lundy mine wholly deserted. The big group of wooden buildings standing on a scarred slope close under the rugged Sierra crest had weathered to a rich golden brown. Abandoned machinery, priceless in its day, some of which had been borne on mule back up a thousand feet of trail, littered the ground. We descended that steep thousand feet to the once thriving town on Lundy Lake. It seemed to have only one inhabitant, the storekeeper, who in response to a question about food supplies said crossly,

"Naw! I ain't got no food. Just can't keep it in stock. Clo'es, I got. Clo'es 'n' shoes."

Perhaps in the isolation of 1915 the old man consoled his idle hours with remembrance of Lundy's good old days of the 'eighties, when young men from Bodie would drive their teams the rough twenty-five miles over and twenty-five miles back just to bring wagon-loads of young people to dance at Lundy of a Saturday night. Or perhaps he had been a witness on days when the Justice of the Peace held court there—the case, most probably, the old court record suggests, one against that perennial criminal John, who one day appears to answer for the theft of a mule, and again of a mare, and still again for "carrying away a person by the name of Lon Hung, a Chinawoman, against the will and consent of Leam Hung," who was her husband. O. J. Lundy serves the warrant, then comes a recess, and in the afternoon the record resumes, in the same handwriting, but with a new wobble in it, and also a new confusion and brevity. The sum of three hundred dollars seems to have taken the place of the person of Lon Hung, and another adjournment brings the case to another morning's clarity and another post-prandial vagueness in the afternoon. Or perhaps our old storekeeper attended that inquest where the jury found that "under a delirious state of mind deceased run into Mono Lake and got drowned."

The names of the officers and witnesses signed to these old records still live in Mono's geography, though few of their descendants can be found in the region today. The Thompson Ranch, the Conway, the de Chambeau, the Mattley, Felicino or Farringdon are as definite and familiar locations as any town's Main or First Street. The Goat Ranch is an exception. The youngest son of Louis Scanavino—one suspects he was born Luigi—still lives there.

The Goat Ranch once was a teamster's paradise. In Louis' wide irrigated meadows oxen, mules, and horses, often as many as seventy head, browsed the night through, gathering strength for the hard two-thousand foot pull up the canyon to Bodie. Louis' thirteen children had a public

school all their own. It is still standing on the ranch, complete with bell and flagstaff, though school has not been in session there for nearly half a century. Old people still remember the family driving to Bodie to celebrate Fourth of July. Their freight wagon was fitted with wooden benches and the horses and wagon were decorated with flags and bunting. The children too were patriotically dressed in red, white and blue, a gay sight until the inevitable Fourth of July thunderstorm poured down on them a mile or two out of town. By the time they reached Bodie's main street the bunting was wet through and had begun to run. The flock of ensanguined children, scrambling down from the wagon to seek shelter in doorways, reminded old-timers of early scalping days.

Scanavino was one of those mighty men so lauded by Charles Shinn, the early-day freight-team drivers. He was a big man, unusually strong. He thought nothing of strolling down a Bodie street with a hundred pound sack of potatoes under each arm. The miners took special delight in holding him standing in talk when thus burdened, with bets laid on the question of how long he would converse before it occurred to him to ease the sacks to the ground. His friend and compatriot, Johnny Dondero, another mighty man, boasted that he feared neither man nor devil. To prove that he lied, a group of his friends dressed themselves in sheets and lay in wait for his team at dusk in the cemetery on the Lundy road. Dondero proved his point. When they flitted toward him, flapping their cerements, Johnny cracked his teamster's long lash above their heads.

"Get back, damn ye!" he shouted. "Get back in your holes!"

Aurora and Bodie newspapers paint their own pictures of the boom days. A man named Lockwood shot himself. "This is the only shooting we have had this week. There is very little amusement in town." Mono-ville, better known as the Mono Diggings, boasting a population of five hundred, proudly lists its enterprises: 1 basket-maker, 1 butcher, 2 justices of the peace, 1 doctor, 1 doctress, 2 shoemakers, 2 express offices, 1 literary depot, 3 livery stables, 10 mining and grocery stores, 16 saloons. Yet only a year later we find it down to a "winter population of three human beings and one Chinawoman." Another item throws new light on the desperate nature of the badness tradition has fastened on Bodie men: "Notis—If any man's or woman's cows or oxen gits in these here otes his or her tail will be cut off as the case may be. I am a Christian man and I pay my taxes, but dam a man who lets his critters run loose, say I."

Bodie's best known story is about a monument in its graveyard. As many versions of it are extant as of Bodie's name. The story centers in that man named Body or Bodie or Boda who discovered gold in the Mono

region in 1859. On a few facts the stories all agree: during a deceptive lull in a heavy storm, Bodie and a companion named Taylor left their camp to search for a sled loaded with provisions which they had abandoned in a sudden blizzard. They were soon lost in the blinding snow, and Bodie's strength began to fail. Taylor tried to carry him on his shoulders, but becoming exhausted himself, "made the best possible provision" for his friend and started in search of camp. He wandered in a circle and presently came back to Bodie, whom he found dead. Eventually Taylor made camp safely, and later that spring he found Bodie's body and buried it.

Here accounts begin to differ. The version that I prefer is Joe Scanova's, prefaced by his usual cordial greeting, "Hi, women!" on our arrival at the Goat Ranch. It bears out Shinn's contention that Bodie's Bad Men owed their reputation as much to the charm of alliteration as to any real supremacy in devilishness over their neighbors. There were big-hearted men in Bodie, too, according to Joe.

A group of miners in a saloon one Saturday night got to talking about old Bodie, the discoverer of their gold. As the evening wore on and drinks warmed their hearts, talk crystalized into action—they took up a subscription and on the spot ordered from the marble-cutter a beautiful monument for Bodie's grave. In the years that had gone by since his death, however, the site of his grave had been forgotten, and in the cooler light of Sunday morning the miners began to reflect that you really couldn't have a grave without a body—or Bodie. But the marble-cutter refused to see reason, the monument was delivered, and for years gathered dust in a corner of Boone's store.

On still another Saturday night another group of miners lamented the death of President Garfield, news of which had just come by fast mule freight. Garfield had been a good friend of the working man—something ought to be done for him in recognition. And what better could they offer a mourning nation than to bury the murdered president under that monument now going to waste in the store? They summoned the marble-cutter forthwith, and gave the order for a suitable inscription.

Before the reply to their offer came from Washington, Garfield had long been laid to rest in an Eastern grave. The fore-handed marble-cutter, though, again proved as stony as his wares. Go back on a bargain just because for a second time Bodie lacked a body? Not he! The inscription was cut and was there to stay.

Obviously there was no help for it. A monument with so eminent a name on it couldn't be left like any old piece of rubbish in Boone's store.

So the miners erected it in the graveyard, and it is still there—so Joe says to tell the bewildered Flatlander that a President of the United States was buried there. If you know what is good for you, however, there is one song that you must not even hum under your breath in that ghost town:

"If a body lose a body . . ."

SOURCES

The Bodie Era, compiled by Herbert Lee Smith, Bancroft Collection, Bancroft Library. (Mostly newspaper clippings from Aurora and Bodie, not identified as to paper and date.)

A volume of Court Records, Homer Township (Lundy), 1884-1889, in possession of Mrs. Venita McPherson, Mono Lake.

The Story of the Mine, by Charles Shinn, New York, 1896.

Conversations with Eugene and Gus Billeb, Mrs. Bertha Peck, Mrs. Venita McPherson, Wallis McPherson, and sons of Louis de Chambeau, Louis Scanavino, and Johnny Dondero; also Nelly and Jake.

Kilowatts in the Wilderness

By E. T. SCOYEN*

IN 1907, our highly respected brother conservation bureau, the United States Forest Service, published a little booklet titled, "The Use of the National Forests." As a reason for doing so, it was stated, "A little misunderstanding may cause a great deal of dissatisfaction." With this as a theme, the author outlines why the national forests were established and what they are trying to do. In view of the circumstances in which a number of our National Park Service areas, particularly Kings Canyon, find themselves right now, it is going to take a lot of understanding by a large segment of our population not only to prevent dissatisfaction but destruction of values close to your hearts.

Even at the risk of carrying the Gospel to an audience already converted and baptized, I am going to spend a few minutes reviewing basic policies and objectives behind our national parks, and how we apply them in our current activities. You can never even begin to understand a problem until you know why it is a problem. Throughout the vast expanse of our nation, except on about one-half of one per cent of the total, the building of dams and power lines, grazing of our lands, logging of our forests, mining of our minerals, and cultivation of our soil, are highly desirable and fully acceptable activities. Why are they not desirable and acceptable on that small segment represented almost entirely by the national parks? Answering this question is important. Getting that answer to enough people so that we will have the strength we need in the days ahead is absolutely imperative.

I regret that in order to make my position clear, I must edge into a continuing and friendly controversy between two former directors of the Park Service—Horace Albright and Newton Drury. This concerns which was the first national park, Yosemite or Yellowstone. Both are Californians, but they are at opposite poles on this matter.

Now, before I prove to you that credit should go to Yellowstone, I want you to know that the fact I was born in that park and lived there for the first 27 years of my life, has not influenced my judgment in any way. Besides, I am backed up by a good Californian, and I am sure that the fact Mr. Albright was Superintendent of the Wyoming Park for 15 years, and loves that 3,400 square mile chunk of the United States even more than

*Superintendent of Sequoia and Kings Canyon National Parks; an address before the Annual Banquet of the Sierra Club, May 3, 1952.

any part of the Golden State, has nothing to do with the way he votes on the subject. Seriously, which is judged first or second is of little importance. The important thing is that we all recognize the significant principle which distinguishes national parks from any other reservations.

The Yosemite Act of 1865 granted Yosemite Valley to California on the condition "that said State shall accept this grant upon the express conditions that the premises shall be held for public use, resort and recreation; shall be inalienable for all time." Further, it was stated, "All incomes derived from leases of privileges to be expended for the preservation and improvement of the property . . ." Just so there will be no misunderstanding, I note carefully that word "preservation." This comes fairly close to stating the national-park idea as I understand it.

In Section I of the Yellowstone Act of 1872, it is stated, "That the tract of land . . . is reserved and withdrawn . . . and dedicated and set apart as a public park or pleasure ground for the benefit and enjoyment of the people." This is the first statement of purpose, but I do not consider that there is anything unusual about it. In my own conception of the fundamental purposes of our Park Service, I have always liked those words "dedicated and set apart." However, that lands should be set aside for public benefit was certainly not new. Going all the way back, was this not the principal object of the Garden of Eden? Thus we can pass up Section I, as it does not, in my opinion, state the national-park idea. If it did, then Yosemite, without much argument, is the number one national park.

Now let us look at Section II. Here the park is placed under the control of the Secretary of the Interior, who is instructed to make rules and regulations for its care and management. Then, quoting, "Such regulations shall provide for the preservation, from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders within said park, *and their retention in their natural condition.*" Are not these words, "and their retention in their natural condition" what we are looking for? Are they not what make our national parks purely an American institution, and significantly different from any previous assignment or dedication of lands to public use? Here, in Section II of the Yellowstone Act, is the heart of national-park purpose as I understand it. We have no logical base from which to fight the destruction of a park's wilderness unless we realize that "public park and pleasure ground" and "benefit and enjoyment of the people" is limited by this provision of Section II. The Act of 1916 establishing the National Park Service further emphasizes this particular point by stating that enjoyment of the national parks, monuments, and reservations shall be . . . in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

My emphasis on this point may seem strange, because I know many people think of the National Park Service as being primarily a recreation bureau. During the past year, 36,000,000 people came to visit the various units of the park system. The transportation and accommodation of this vast number of vacationists is a real problem, and as the years have gone by many millions of dollars have been invested in the roads, trails, campgrounds, hotels, lodges, cabins, restaurants, stores, service stations, bus lines, saddle and pack stock, water and sewer systems, ranger stations, and museums. These and many other items must be provided in order that these millions of people may reach the areas, enjoy and gain an understanding of their features, and live in a reasonable degree of comfort while there. Such developments, and the vast tourist traffic which is attracted to these parks and monuments, lead people to believe, quite frequently, that this agency is principally interested in tourist promotion.

To make myself clear, I want it known that I never have been numbered among the apologists for what has been accomplished in the way of providing access to the parks, and accommodations therein, for our people. Considering all the difficulties we have faced, the fact we were operating in a new field of land management, and have never been able to catch up to the demands the visiting public have imposed upon us, I think that a very good job has been done in these respects. I have always resented the terms "tin-can tourist," "invading hordes," "messy multitudes," "motorized locusts," and many others of like nature all too frequently and contemptuously applied to perfectly normal, law-abiding, and generally appreciative citizens bent only on enjoying their own parks.

In our plans for the development of Sequoia and Kings Canyon, we recognize three different problems. In the first place, we have our mass-use of the area. To accommodate this, we have built highways and provided what we call developed areas. Here is where you find the crowds frequently, these days, snowing under the accommodations we have been able to provide. But I think the situation has its better side. A few years ago we calculated that in Sequoia these areas, which accommodate over 98 per cent of our visitors, take up about 0.3 of one per cent of the land in the park. This figure for the Kings will be much lower—probably around 0.1 per cent. The design and placing of the lodges, campgrounds, and other facilities for public accommodation occupy a good part of our attention so that damage will be held to a minimum. However, I have never attempted to defend our policy of wilderness preservation in these developed areas, and in the past have become very impatient with some of my superiors who insisted on doing so. Fortunately for me, perhaps, they were never aware of this fact.

As to the future, everyone must realize that we cannot continue to accommodate the constantly increasing stream of visitors on what we have now. We will have to expand our present capacity in such areas, and may have to find locations for additional ones. However, we can, I am sure, work this out without major extension of our highways, which is the thing most people seem to fear. In the end, we may have to raise that 0.3 of one per cent up to five-tenths. The situation beyond that can be left to future generations.

Our second category consists of the trail-accessible regions. In Sequoia and Kings Canyon we have 940 miles of trails. Some sections are excellent, some good, some fair, some poor, and some the subject of picturesque mountain blasphemy. I hope some time to be able to reconstruct and improve much of this, particularly in Kings Canyon. Some new construction is planned, but even on what I call our 105-year development program there now shows only 70 miles of new work, and some of this is carried merely for study purposes.

As far as the problems of preservation and protection of wilderness values are concerned, these trail-accessible and not the developed areas are the ones that are, I think, most in need of study, planning and management. Most of the complaint and criticism the Park Service receives is directed at our areas of concentrated public use. Much of it comes from users of the High Country, who, in many cases, must be completely unaware of the widespread impairment for which they are to blame. Certainly we have millions of items of evidence scattered over the mountains to demonstrate that all the tin-can tourists do not ride in automobiles. Also, the 800,000 people who went to Crescent Meadow last summer, and the hundreds of thousands for many years before that, have left it virtually undisturbed, while the stock of a very few people have grazed and trampled some of our fine mountain meadows virtually to destruction. When the visitors who ride out beyond the end of the roads realize that there are some people in this classification of users who are also problem children, they may become more charitable toward those who stay closer to home—and assist us in working out a suitable solution.

During the past two years we have carried on extensive studies and investigations of the problems of high-country use. Within the limits of available funds, we have attempted to launch a modest educational program directed at the travelers on our trails. As a result of a trip through the Kings last summer, our Director, Mr. Wirth, made it his personal mission to see that we were provided with funds to put four additional men on back-country patrol this summer. One of these will be a perma-

ment ranger assigned to the definite task of gathering information which we need to plan a program. It is the first opportunity we have had to develop a specialist on back-country use. We feel that with proper management, our high country can accommodate, without damage, many more people than go there now. However, there may be a limit and this is something which must be determined far in advance.

While on the subject of our trail area, it might be well to mention something about the problem of cattle grazing. When the Kings Canyon was established in 1940, we agreed to continue a total of sixteen Forest Service permits. It was a somewhat distasteful bargain we were forced to make if we were to have a park at all. I am glad to report that of these sixteen permits, only four are now active. One of these represents a two-year extension recently granted managers of the estate of a life permittee, and which will definitely end in 1953. We have been gratified by the coöperation the cattlemen have given us and have been pleased to have their thanks to us for fair treatment and for living up to our commitments.

Finally, we have our third classification. We hope to retain a few areas, and I hope some will be quite extensive, available only to backpackers. This is a point on which I know we have the full support of the Sierra Club. The past summer I came in contact with an operator of an outfit who took violent exception to this item in our program. He came up with the suggestion that the real heart of a wilderness adventure is to let everybody do virtually as they please. Personally, I rather like this conception, but my experience indicates quite clearly that we no longer have enough area left to permit a complete throwback to the pioneer days and ways.

If we can keep each of these three classifications in its proper place, I think we will have done a very good job in harmonizing the competing objectives Congress has given us. With the exception of a few major problems, I think we have reached a fairly high degree of skill in managing our developed areas. For the major problems which remain, I think we know the solution, but it is a case of waiting for the means to be provided. We are far behind in handling the problems of the trail traveler, but are making progress. The recesses beyond the end of the trail should not cause much concern, aside from keeping horses, mules, and burros out of them.

I may have hammered on this matter of purposes and objectives, and how they are applied, at entirely too great length. On various points there will be differences of opinion, and these are respected. However, I hope that my position, which I am sure represents that of the National Park Service, is clear to you all so that in our relations "a little misunderstanding will not cause a great deal of dissatisfaction."

Now, before I close, I think we should look into this matter of the Los Angeles Power applications. When the filings were first revived in 1948, I had good reasons to believe that it was an application of pressure designed to force a concession somewhere else, probably on the distribution of Colorado River power and water. Even when the present filings were made a few months ago, I was still inclined to doubt if there were serious intentions to push the matter through. However, after conferring with people who keep very closely in touch with this situation, I am afraid that this may be the big push. If this is so, then I can only say that no proposal ever made relative to any national park ever carried the seeds of such vast destruction as is now faced by Kings Canyon.

It may be of interest to take a brief look at the history of Los Angeles and its efforts to obtain power sites in the Sierra Nevada of California. Its present filings in Kings cover a lot of ground, but are only a fraction of the first plan proposed of which I have record. Our files contain copies of a series of five letters dated June 30 and July 1, 1920, written by Walter Huber and addressed to Mr. Colby. Each of these covers a separate filing by the City of Los Angeles. There were two in Yosemite; one on the San Joaquin headwaters, one contains the essentials of the pending Kings Canyon scheme, and finally one on the Kaweah River in Sequoia. I also find mention of a project on the Kern.

Perhaps the construction of Hoover Dam may have been a major factor in preventing the realization of this ambitious program. I do not know just how actively the others were pushed as time passed, but certainly the Kings Canyon proposals have been kept alive through the years. I think we all realize that the point to keep in mind in relation to these Huber reports is the complete disregard of these power planners of the purposes for which the national parks were established. The main reason for this is simple. In a report on the Hetch-Hetchy project in 1910, it was hidden under "Freedom from conflicting legal claims." In other words, San Francisco would not have to pay for the land or privileges involved.

I have said that granting the Los Angeles application would remove the heart of the Kings Canyon National Park. With everything complete, we would have dams at Simpson Meadow (215 feet), Paradise Valley (175 feet), and Grand Sentinel (105 feet).

In addition, there would be one of 285 feet at Tehipite Valley, and another of 155 feet at Cedar Grove. There would be another dam at the junction of the South and Middle forks, and some other installations on down the stream. Tying this all together would be a series of tunnels and conduits. Power would be developed at Simpson Meadow, Tehipite, Paradise, Copper Creek, Cedar Grove, and the junction site. This is bad

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enough but if there should be justification for this much, why is it unreasonable to expect that we should eventually have forced upon us the enormous undertaking outlined in the Randall Report. The pending projects are its main features.

Anyone who has the slightest idea of wilderness values will quickly realize, without detailed description, the enormity of the destruction which would be involved. However, in addition to this we should keep in mind that the roadheads would then be at Simpson Meadow and Paradise. This would be a disaster even if dam construction were not involved, as the entire park area would be within an easy day's trip of a road end.

On the strength of the facts we now have, it appears that failure to get the dams at Simpson Meadow, Paradise, and Sentinel, all within the park, will also kill those at Cedar Grove and Tehipite. Complete integration is needed to make any single part economically feasible.

Now defending these "things of the spirit" is not always a pleasant task. The opposition has one avenue of attack which he always uses. When other means fail, ridicule can be the weapon. An editorial in a San Francisco newspaper of January 10, 1909, on the Hetch-Hetchy, discusses the needs of posterity for wild areas and ventures the comment: "Any pretense that it must be preserved untouched for 'posterity' is nonsense. We do not know what posterity will want. Posterity will probably not contain so many fools . . . the long-haired sentimentalists may go hang." The opposition to this project for bringing pure mountain water and kilowatts to San Francisco? "It is the evidence of the weak nerves of a degenerate race." "Sentimentalism as it is sought to be applied to Hetch-Hetchy is rot."

I am sure that John Muir and Will Colby, leading the Sierra Club opposition, shrugged this all off and endured quite well: ". . . the cause which they advocate has no basis in reason, and no hope of success if reason is relied upon to win." However, they must have been irritated, to say the least, by the charge, "Now, there was never yet on earth a real fight put up by alleged 'lovers of nature' which did not have its inspiration in the money of cold-blooded and cold-hearted men who are endeavoring to accomplish a sordid purpose."

Now as to the type of people who were on the side of dam proponents, according to the newspaper, "They will be hard headed and solid men." Also, "the robust and energetic visitors . . . will never care a rap . . . whether they see water or a dry plain."

We have already seen what indignities we can expect in a struggle of this kind. However, based on the past, we are also the "long hairs," "misguided crackpots," "artistic screwballs," "dam-as-is-ers," "hoggish,

"mushy, aesthetes" and many others. This is what happens to those who attempt to defend intangible values.

So far as I know, no one has ever succeeded in placing a value on the wilderness, though it has been seriously attempted. We are able to fix the enormous dollar returns which flow to local communities from tourist traffic which is bound for our developed areas. But to say what Simpson Meadow is worth in relation to a scale which can generally be understood seems impossible. It is almost the same as trying to assess the dollar value of one's religion. However, the Los Angeles Bureau of Light and Power Commissioners have no trouble at all on this score. They say it is worth 249,820 horsepower of electric energy. On the basis of this price, they ask the privilege of destroying a superb wilderness. But more than this, there is a completely ridiculous side to the matter. If this wilderness, of which we each own and cherish a share, is to be bought for 249,820 horsepower, its price will be paid not to us, but to the people who take the value away and destroy it!

Despite the difficulties we may foresee in combatting the subject applications, the picture is not all on the dark side. Even the species of animal described above, combined with powerful San Joaquin Valley irrigation interests, did beat this proposition once before. At that time we did not have the advantage that most of the sites were in a national park, as they are now; but the Federal Power Commission rejected similar applications in June 1923.

It should be kept in mind that this first struggle over power dams in the Kings was merely part of another battle. This was the proposed extension of the Sequoia Park boundaries to include all the area now in the separate Kings Canyon Park. The defeat of the park proposal was due almost entirely to the opposition of the irrigation interests on the Kings Delta. While opposing the park extension, they also were most aggressive in resisting the Los Angeles filings. Frederick Law Olmsted, writing from Los Angeles under date of August 1, 1921, stated, "I see no prospect of harmonization of the views of the City of Los Angeles and of the San Joaquin Valley people on this point."

I think Mr. Olmsted's statement is just as true now as in 1921. Just recently the Water Committee of the Fresno County Chamber of Commerce asked the Board of Directors of that organization to pass a resolution which they had prepared. This was done by a unanimous vote, and it states, "That the Chamber is unalterably opposed to the construction by any agency, be it federal, state, municipal, or private, of any dams, reservoirs, tunnels, or power houses within the boundaries of Kings Canyon National Park, as such works are necessarily destructive of the scenic and

recreational values of that reserved area; further, that such works would necessarily interfere in a material way with the required irrigation stream flow regulation at the Pine Flat Reservoir."

The resolution also advocates that the power resources at Tehipite or Cedar Grove shall be held for disposal exclusively by the Kings River Irrigation Associations. For reasons I do not have time to detail here, this virtually kills these projects. You understand, of course, that these two sites are not in the park. This means that they can be developed on approval of the Federal Power Commission. The Secretary of the Interior has protested construction at these sites, as well as in the park.

This matter of interference with natural stream flow has had farmers depending on irrigation battling dams in the mountains for a half century. That we do not have small check dams at the outlets of every lake in the Kaweah Watershed is due to an injunction obtained by irrigators against a power company, I believe, in 1904. Those in the Service area of the Kings River have served notice that even this more modern program of check dams we hear about to improve fishing, will not be tolerated, and for this I am most thankful. In any event, the irrigation associations have their own reasons to object to dams on the Kings River, and will, in my opinion, fight to the bitter end this attempt from the south to use their water. Again I am most thankful. During the fight to establish the Kings Canyon Park, the sportsmen down our way exerted every effort to have the proposal defeated. However, they are on our side this time.

As a final word on this threat to Kings Canyon, I would like to suggest that every resource of the Sierra Club be used to check the reasons which may be advanced for the project. One of our senators has written, "It is my sincere belief that we should always preserve our natural lands and scenic areas wherever their value to the people of California is not greatly outweighed by the benefits of natural resource development." This is perfectly sound, but we should be around when the scales are balanced and someone finally says what outweighs what. As an example: I have been told by people who should know that the cheapest way to produce power for consumption in Los Angeles is by steam generation. Such facts should be determined. I think we can have considerable assurance that this colossal power development in the Kings Canyon National Park will not be permitted until there is a lot of "outweighing."

If enough people learn, as has been said, ". . . to recognize wilderness environment as a human need rather than a luxury plaything," then we can, I am sure, maintain our Kings Canyon National Park in its natural condition and pass it on unimpaired to future generations. But we have a job ahead of us!

Duncan McDuffie - 1877-1951

THE CAUSE of conservation lost a valiant leader in the death of Duncan McDuffie on April 21, 1951. His untiring and effective labors in the setting aside of parks and the saving of our matchless redwood groves made him an outstanding figure among his fellow men. The good that he did so unselfishly and ably will live on and continue to serve as an inspiration for those who follow in his footsteps.

He was born in Jefferson, Iowa, September 24, 1877, attended high school in Santa Barbara, and graduated from the University of California in 1899. In 1911 he married Jean Howard. Their congenial tastes and common interest in conservation and social welfare created a bond that was the subject of deep admiration by their great circle of devoted friends.

Duncan McDuffie played a large part in the life of the Sierra Club, and the club in his. He went on several of the early outings and there showed his great love of the mountains and the out of doors. Mrs. McDuffie wrote last year to a friend: "When I first met Duncan (which was in Paris, above forty-five years ago) I remember his saying that he worked eleven months of the year so that he could live one month in the mountains! And he never ceased to find them an enchanted world."

The mountaineering feat of which he was proudest was the opening up of a trail across Muir Pass—the most critical point in the search for the high-mountain route from Yosemite to Mount Whitney that has since become the John Muir Trail. This he accomplished in 1908, accompanying the late Joseph N. LeConte and James S. Hutchinson on a trip described by LeConte in the *Sierra Club Bulletin* for January, 1909. While on this trip the party made the first recorded attempt to cross Mather Pass and made the first ascents of Mount Mills and Mount Abbot.

With Hutchinson and Onis Brown, who packed them in, Duncan accomplished a still more difficult mountaineering feat twelve years later. Their party, having made the first stock crossing of what has become known as Colby Pass, found itself close to the unclimbed and treacherous Black Kaweah. The three of them set out to learn at first hand about the unusual dangers from loose rock that exist on this peak. Hutchinson was himself narrowly missed by a falling rock, and when they first reached the precarious, weather-shattered knife-edge of the summit ridge Duncan said, "We'd better hurry over this before it falls to pieces." They found a safer route by descending and traversing to a chute that led directly to the summit, which they attained after eight hours of steady and arduous climbing.

The beauty which he knew so intimately in mountains came to pervade



DUNCAN McDUFFIE

1877-1951

TO ENTER a primeval grove of giant red-woods is to step within the portals of a cathedral — dim, lofty, pillared, and peaceful. But this temple which the Great Architect has been building for a score of centuries is incomparably nobler, more beautiful and more serene than any erected by the hands of man. Its nave is loftier than that of Amiens and longer than that of St. Peter's. Its wine-red shafts, rising clean and straight over two hundred feet, are more numerous than the pillars of Cordova; its floor is carpeted with a green and brown mosaic more intricate than that of St. Mark's; its aisles are lit with a translucence more beautiful than that which filters through the stained glass of Chartres; its spires pierce higher than those of Cologne; its years are greater than those of the first lowly building devoted to Christian service. To destroy this noblest of places of worship would be more irreparable than was the destruction of the cathedral of Rheims.

—DUNCAN McDUFFIE

Duncan McDuffie's vocation. He entered the real estate business in 1905 and in the succeeding decades made a profession—in one of the most critical interpretations of the word—of land development. Some twenty-odd subdivisions in the San Francisco Bay area were carried through to success under his guidance, among them Claremont, St. Francis Wood, Northbrae, Berkeley Heights, Claremont Court, and Park Hills. St. Francis Wood won national acclaim. The measures he pioneered to insure harmony in landscaping and architecture—to create and protect beauty—have been adopted by many developers throughout the country. Nor did he prescribe standards of beautification for others that he did not adhere to himself. His spacious garden in Berkeley, especially at azalea and rhododendron time, was one of the most beautiful gardens anywhere.

Duncan's love of mountains was no summer-time affair; he devoted himself to it year in and year out. He was a director of the Sierra Club for many years, having been first elected in 1922. With brief intermissions, he served until 1946. He was vice-president in 1928 and president from 1928 to 1931 and again from 1943 to 1946. He was elected an honorary vice-president from 1941 to 1943 and from 1947 until his death.

His part in the great work of the Save-the-Redwoods League was also outstanding. He became a director in 1925 and served as its president from 1944 until his death. It was while he was president and under his auspices, with the effective assistance of his wife, that the famous National Tribute Grove, in Del Norte County, was set aside as a state park. He was one of the prime movers in the establishment of the California State Park System. His distinguished service in aiding the creation and preservation of state and national parks brought him the Cornelius Amory Pugsley medal in 1929. He was chairman of the Yosemite Advisory Board, appointed by authority of Congress, for many years prior to his death. He was honorary president of the California Conservation Council, chairman of the State Parks Council, trustee of the National Parks Association, and director of the National State Parks Council. In 1950 the honorary degree of Doctor of Laws was conferred on him by the University of California in recognition of his notable work in conservation and civic leadership.

Duncan McDuffie was like one of the forest giants he did so much to preserve, one that we all looked up to with admiration and affection. When he left us, the vacancy we felt was as if a forest titan had fallen. But we find some consolation in the words of John Muir: "Nature takes fallen trees gently to her bosom—at rest from storms. They seem to have been called home—out of the sky to sleep now."

WILLIAM E. COLBY and DAVID R. BROWER

Mountaineering Notes

Edited by ALLEN P. STECK

Climbing Safety in the Parks

PEOPLE as individualistic as most climbers are do not welcome any curtailment of their independent spirit. However, because a good deal of the climbing goes on in national parks and the Park Service is responsible for the people in the parks, it has been deemed necessary to set up regulations (usually different in each park because of the difference in the climbing) to safeguard climbers and to make it easier for the Park Service in the event of accidents. Although the regulations do not protect the irresponsible climber who climbs where he will without registering, they do slow down the climber who may not have been thoroughly cognizant of what he was planning to take on, and it gives the Park Service a chance to check with the climber on the equipment and technique he needs.

The first summary of mountain climbing reports was brought out by the Safety Committee of the American Alpine Club. Since then the National Park Service has issued an annual report from the areas of the National Park System. The Natural History Division has coördinated the climbing activities in the Washington Office, and has maintained contact with mountaineering associations and their respective safety committees. From Paul R. Franke, Assistant Chief Naturalist (recently appointed superintendent of Zion and Bryce National Parks) has come the summary of mountain climbing reports in the national parks for 1951.

The report expresses the hope that if the annual area reports and the summary have helped to establish a general awareness of the scope of the activity and problems of control, they are fully justified. "Further, it is to be noted that, with more participants, there is a decided downward accident trend, probably attributable [climbers would prefer 'possibly'—if they agreed at all!—Ed.] to tightened enforcement of regulations, and improved methods of inspecting climbing equipment. With all this, there are more contented climbers and fewer complaints.

"Most gratifying is the acceptance of the representative associations that the Service rules and regulations are promulgated and enforced to protect the climber and not to prohibit climbing. The interested associations have also taken it upon themselves to impress their membership with the need of exercising every precaution and complying with the regulations, both for their own safety and to increase confidence in the general public that mountain climbing is a wholesome, healthy outdoor activity"

The report shows that no accidents in connection with mountain climbing occurred during the 1951 season in Grand Teton National Park; no reportable mountaineering accidents at Mount Rainier; nor any serious accidents in Olympic, Rocky Mountain, or Sequoia and Kings Canyon national parks. Yosemite had 569 climbers (158 more than in 1950), mostly experienced. Excellent coöperation was displayed throughout the season; climbers consistently registered before making the climbs and checked in upon return, and there were no accidents among the authorized climbers.

"There was no report of adverse criticism of the rules and regulations which have now been in effect for nearly ten years without change. Climbers are becoming used

to them and National Park Service employees are enforcing them in a manner that brings excellent coöperation. Reports of clubs disciplining members for infractions of National Park Service rules bear witness to the acceptance by mountaineering groups of the procedures we have adopted. The record of no accidents on authorized climbs is gratifying"

There were a number of accidents in the parks which were not attributable directly to authorized mountain climbing, and those are recorded in the report. Most of them were due to inexperienced persons' attempting short cuts off the trails.

It is impossible to tell from the few years' records just how effective the regulations may be, but the annual reports are of great value in showing the trend of accidents. In a few more years, with more statistics, conclusions may be accurately drawn. What is important is that, along with the education of prospective climbers in their organizations, the coöperation and understanding continues between these climbers and the National Park Service.

H. T. P.

Shiprock Revisited

[The following is excerpted from a letter to the Editor written by then Airman First Class William E. Long, of the 3904th Training Squadron, USAF, at Camp Carson, Colorado, and dated 29 April 1952.]

Jim Wilson, a fellow named Bob Skinner, and I have followed Bedayan's, Robinson's, Dyer's, and your thirteen-year-old tracks up Shiprock. It all started last November when Skinner and I drove to the rock and reconnoitered a route to use on a return trip. At that time we reached the base of the North Tower from a sandstone gully west of the basalt gully but we had neither equipment nor time to press the route farther.

We arranged to meet Jim during the months between climbs and last Saturday morning Skinner and I awoke to see Jim's car bouncing over the desert toward us and Shiprock. We started on the rock at 8:30 A.M. and were at the North Tower notch by noon. Down the gully to the east took a short time but we lost time looking for the route at the mouth of the gully. Once on the traverse we traveled well to the overhangs. I banged up them both in an hour—which was only possible by use of a few of the pitons that were in place, not to mention the very strategically placed bolts. Once over the overhangs we had nothing but a walk to the notch between the two summits where we chose to use the cave you evidently had used for the night ahead. We still had two hours of daylight so we went to the notch. I led up to the horn, using again your original pitons that were well in place, needing only a couple of taps to make them do their job again. I tossed the rope to Skinner on the ledge and climbed up with its aid. A shoulder stand put Bob and Jim over the next step and all that remained was the very simple climb to the summit. We were on the top at dark of the same day we had started. Descending to your old bivouac, we spent the night feasting and drinking of the rations we had carried for three days' use. Next morning we rappelled and met Dimitra Wilson at the cars at noon.

About two weeks ago a group from Colorado University made it, so ours was the third ascent as far as we know now. They spent three nights on the rock and four days. They must have had heavy loads, and they also put pitons and bolts all over the place. They had unscrewed the bolts so we were not aided by them, except for one or two which could have been bypassed.

The short traverse from the top of the first overhang to the bottom of the second is what amazed me. I still don't quite see how that first piton was placed. No wonder it took the best part of a day!

Yosemite Climbing Notes

ALTHOUGH mountaineering in Yosemite Valley was nearly brought to a standstill during World War II, the number of active climbers has certainly now surpassed that of previous years. Many new ascents have been added to the list of standard climbs. The climbing is, in fact, better than ever. Climbing trips to Yosemite Valley are regularly held by at least five organized groups. Two of these, the U. C. Hiking Club and the rock climbing section of the Loma Prieta Chapter of the Sierra Club, have been organized within the last three years. The Stanford Alpine Club and the San Francisco Bay Chapter of the Sierra Club have been especially active lately, the latter group having spent three scheduled and many unscheduled week ends in the valley. The rock climbers of the Southern California Chapter are also often drawn to Yosemite for pursuit of their favorite pastime.

Since the inauguration of the Yosemite Valley qualified-climber system in 1948, not a single serious climbing accident has happened in an organized party. The system is simple. Each club submits to the Chief Ranger at Yosemite a list of those persons who are considered to be qualified as climbing leaders. Not only must these persons have had ample experience with the climbing rope, but their judgment must be unquestionable. The rule is that every party climbing on Yosemite walls will include at least one qualified leader. Coöperation between park rangers and clubs using the qualified system has been excellent.

Almost every wall, gully, and pinnacle in Yosemite Valley has been ascended by some route, so today the emphasis is on new routes for old climbs. Ascents which originally required class-6 climbing are now being attempted without the use of artificial aid. (Of course, pitons are always used for protection whenever there is a chance of a serious fall.) However, there remain a few major unsolved problems. The north face of Middle Cathedral Rock presents a cliff which no reasonable climber will attempt unless prepared to spend several days (and nights) on the wall. Tenaya Canyon offers several possibilities of first ascents. Two expansion bolts have been placed on the north side of Lower Watkins Pinnacle, but no further progress has been made. All attempts to reach the base of this spire from the south (below) have failed. Parties have been on the north face of Clouds Rest at least twice, but the summit remains unconquered from this approach. With the recent ascents of such giants as the Sentinel Northwall and the Lost Arrow, it would seem that it is only a matter of time before the last invincibles will fall.

The following are a few recent ascents in Yosemite Valley:

Yosemite Falls Gorge Traverse (between Upper and Lower falls). Class 5, low water only. First ascent by Dave Hammack and George Larimore in 1950. The top of the Lower Yosemite Fall was attained by climbing Sunshine Ledge. Yosemite Creek was crossed at the very brink of the falls, and an easy walk on the west side of the creek for several hundred feet followed. The climbers surmounted the first major cascade by keeping to the left (west) until progress was blocked and then traversing right to the brink of this fall. The route then followed the steep granite

slope to the left of the creek to a point about 75 feet above it, where progress was blocked by the fifteen-foot overhanging wall. Here the route led up beside a tree on the somewhat broken face. With two pitons for protection and a hidden thank-God handhold, the climbers surmounted the overhang. From there it was easy going to the base of the Upper Fall. (Account by Dave Hammack.)

Potato Masher. The rock can probably best be reached from the switchbacks on the Glacier Point short trail below Union Point by either climbing down the ridge below the Point or traversing eastward from the switchbacks between the 5,500 and 5,750 foot contours. We reached the rock, however, by following the watercourse and gully running southwest from LeConte Lodge. It is represented on the topographic map of Yosemite Valley by a small contour circle at 5,750 feet almost due north of Union Point. Actually, the circle represents three pinnacle-like rocks, the lowest and northernmost being separated from the broken arête by a col about thirty or forty feet deep. The rock is a flat-topped granite shaft, some sides overhanging, others nearly vertical, rising some thirty feet above the base of the col. Such a height is in no way remarkable in itself, but the sheer drops of two to three hundred feet on the east and west sides are very much like those surrounding Split Pinnacle. Its resemblance to the German-type hand grenade led us to call it the Potato Masher. We climbed up the southeast corner of the rock, using two pitons for safety. A register has been placed. Don Sorensen, John Marten, George Maring, and I took part in the ascent. (Don Currey.)

Watkins Gully. Class 6. First ascent in September, 1946, by Fritz Lippmann and Rolf Pundt. From Tenaya Canyon, Watkins Gully, the cleft immediately west of Mount Watkins, deceptively appears to be a short cut to the valley rim. It was for a closer look at the Watkins Pinnacles that Jim Wilson and I, on October 27, 1951, ascended the gully. Our route led directly up the gully, but perhaps a better course is to ascend the prominent ramp below the pinnacles which leads to a unique tunnel through which the gully proper may be attained. The average angle of the gully is not great, but the series of waterfalls present separate problems, especially when the creek is flowing, as it was when we made the climb. The chief obstacle is a tremendous overhanging chockstone which forced us to climb out on the right (west) wall. After placing several pitons for protection and finally, two class-6 pitons, Wilson managed to lasso a granite block above the overhang and pull himself back into the gully. On this climb there is no chance of getting "off route" as the gully walls are nearly unbroken and vertical—considerably steeper than is indicated on the topographic map.

Phantom Pinnacle. On the southeast face of the Cathedral Spires Buttress, hidden from the usual Yosemite Valley view spots, stands a 400-foot spire popularly referred to as Phantom Pinnacle. This spire, although rising only 90 feet from the notch where it joins the buttress, involves some 400 feet of vertical climbing from the base.

Noon, on September 8, 1950, found Bob Swift and me placing a piton ladder up a vertical crack on the east face of the Phantom. Three hours of pounding, however, only brought us to the termination of the solitary crack, and with no prospect of new breaks in the rock, we abandoned our recently won eighty feet in a single rappel.

The next morning we were up at dawn examining a possible route where the south-west face of the pinnacle forms a right angle with the buttress wall. A series of vertical cracks seemed to extend continuously upward to the notch, and so we decided to make our second attempt here. Bob led two pitches, the last one requiring six direct-

aid pitons, to an oak-covered ledge. After another short pitch I continued up the crack, with a piton ladder providing the only possible means of ascending this 90° wall. At rope's end, I reached the long-hoped-for belay ledge. This lead took 17 pitons, of every variety, and it lasted 3½ hours. Bob resumed the lead and with four pitons achieved the tree ledge, where we made our night bivouac.

At dawn we continued from the notch, this time climbing on the north face, where cracks abounded, although the angle of the rock was definitely overhanging. Halfway up the pitch the severity of the overhang lessened, and by 11:00 A.M. we both stood on the summit. After building a cairn and placing a plastic tube register within, we rappelled from a small tree on the west lip of the pinnacle to the notch, and three more full-length rappels brought us to firm talus.

We used 40 pitons on our ascent and carried, besides, our rappel rope and hardware, rucksacks containing food and clothing in anticipation of a bivouac. However, with previous knowledge of the climbable route, two men skilled in tension techniques might make the ascent in a day.

WILLIAM W. DUNMIRE

New Route on Devil's Tower

On October 30, 1951, a party of four, Herb Conn, Art Lembeck, Ray Moore and Tony Soler, all from the Mountaineering Committee of the Potomac Appalachian Trail Club (Washington, D.C.), made a new route on Devil's Tower (see below), Wyoming. Thirteen ascents of the Durrance Route had been made after the adjacent Wiessner Route was climbed as the first ascent, in 1937. The new route, christened the Soler Route, is some 150 yards east and north of the Wiessner.

The first pitch was about 240 feet long and required 23 pitons, including 6 for direct aid. Since the knotted 120-foot climbing ropes would not pass the carabiners the leader tied into a piton while his second Prusiked up to clear the lower sections. The second man then tied into pitons until his services were required higher up. The belaying was done from the base of the climb. One fall occurred, but was adequately held. No injury resulted except a few scratches on the leader's bare forearms; an Army angle piton, Army aluminum carabiner, and a dynamic belay on the $\frac{7}{16}$ -inch nylon rope reducing the fall to a minor inconvenience.

Three more pitons were used to reach the Big Ledge (the class-2 part of the standard routes) at its north end. From this point the climb is a scramble. Descent was made by the Durrance Route. The round trip required about 12 hours.

A. C. LEMBECK

On Conserving the Apostrophe

We take this occasion to launch a quiet revolution, in eight point, against the cartographer-inspired illogic of omitting the apostrophe from place names. The name in the article above appears officially as "Devils Tower"—a designation we are sure the person who bestowed the name did not have in mind at all. For some reason, in years gone by, the devil was given the credit for many land forms that we now consider beautiful enough to warrant federal or state protection. Old Nick, if not given credit for the construction, was at least given credit for the possession of Devil's Tower, Devil's Crags, Devil's Postpile, and Mount Diablo, to name a few.

Some official, many years back, decided that the apostrophe should go—unless the place in question were still in the actual possession of the living person for which it was named. At about the same time, that official or a near relative decided that places should not be named for a living person. Concurrently, then, the apostrophe and good sense were disposed of. In the case of the tower and the crags, we ended up with ambiguity. Unless one is willing to consider "devils tower" as a complete sentence telling how big devils get, the meaning is gone. We don't know whether one or more devils once possessed the place. We know no more about the crags. The official name for the third place becomes inane—Devil Postpile (a contraction of deviled postpile?). Mount Diablo hasn't been tampered with much; the name derives from Monte del Diablo (Devil's Woods), and we can be thankful it hasn't become, to suggest that apostrophe-less plural, Mount Diablos.

Possibly the cartographers have a reason for not wanting the ' on their maps. Maybe they fear confusion with the symbol for prime or for minute or for a small house, spring, piece of trail—or maybe the military people want to save it to designate the size of a unit or caliber of a weapon. We don't know and suspect that only the hair splitters would be confused. But we'll let someone else argue with the cartographers.

From our own experience with typography, however, we'll say that no possible confusion can result from the conventional use of the apostrophe, just the way we learned to use it in school. And in the place names we print, from this day until someone can marshall sensible reasons against our doing so, we'll use the apostrophe just the way it should be used to make sense. We won't give a fig whether the devil is still in possession or not, because that is of supreme unimportance to everyone but the census taker. In our book it's going to be Devil's Tower, Devil's Postpile, Dick's Peak, and even Pat's Hole (Dinosaur National Monument)—in short, an apostrophe wherever past, present, or future possession is intended to be shown by the designator. It we're run out of town for this dastardly act, we'll bivouac on Clouds Rest.

D. R. B.

Yosemite Point Buttress

THE WATER boiled vigorously and curled over a lip of granite above us. It was late spring—that time of year when anticipation is excited by the freshness of one's surroundings. Bob Swift and I walked up the ample tongue of snow in the bottom of the Yosemite Point Couloir, turned, climbed up a little way where the gully steepens, off to the left and stopped. This was the place. Our goal, Yosemite Point, was high above. We followed the line of its buttress, searching, wondering, speculating how we might reach its top. This was the first attempt—all new experience, all unknown.

The last orange peel escaped, went spinning down the slope and danced across the snow. Methodically we prepared equipment for use, and the first man stepped up, his fingers gripping the firm rock. Time passed quickly. There was little of it for rest, for we had to reach some sort of bivouac ledge before dark. Several overhangs blocked our way, but we easily passed them by skillful use of piton and hammer. The route was clear to us as far as the large pine tree, easily seen from the bottom. At the tree we left our packs and went ahead to find the way. Bob found himself in a difficult position going over to the right into a smooth, wet gully and convinced

himself that the route should be pushed to the left; but our day was used up and we rappelled to the tree and set up camp on our narrow ledge. A small pocket cooker added some warmth to the water taken from the watercourse near by. We could find little consolation in the bivouac's uniqueness. Sleep helped, but it came sparingly.

We jumped quickly to the task at hand when daylight permitted. The way to the left was easier than we had at first expected, and by 10 A.M. we came upon the ledge at the foot of the final cliff. It was quite large. Scraps of wood lay about; bits of paper and even an old sardine can, which upset us no end. Water was running down over much of the face above us, but closer observation indicated a probable route out to the left and upward for 15 to 20 feet. What then? Bob was the first to have the courage to admit that he had little desire to go up there, which left me with two choices: confess to the same impulse, or reluctantly grab the hammer and go on. I grabbed the hammer. Ten feet up, further progress became doubtful, at least for me. A streamlet was crowding the crack I wanted to use. Remembering similar streams, I turned back. Satisfied with our reconnaissance we departed for home.

Memorial Day saw another attempt. Oscar Cook, Bill Long, Dick Long, and I reached the upper ledge in the course of one long day. The water was gone, fortunately. After the customary amenities, such as, "If you insist, Bill, you are welcome to take this (ugh) lead." Bill Long began the ascent of the one touchy lead on the climb — the kind that entails placing pitons back-to-back!

His brother and Oscar lounged in the sunshine, occasionally raising themselves up on one arm to offer advice. Above, to our combined surprise, we were able to go on unaided by pitons for a considerable distance. Continuing back to the right we came to a small sandy ledge, just right for two. We looked up — our hopes froze. A smooth wall, broken by a single crack, ended in an apparent overhang. That was enough for now.

Crack that last barrier and the climb was ours. I was convinced of that. Swift, unable to resist the temptation, joined me on the third attempt. This



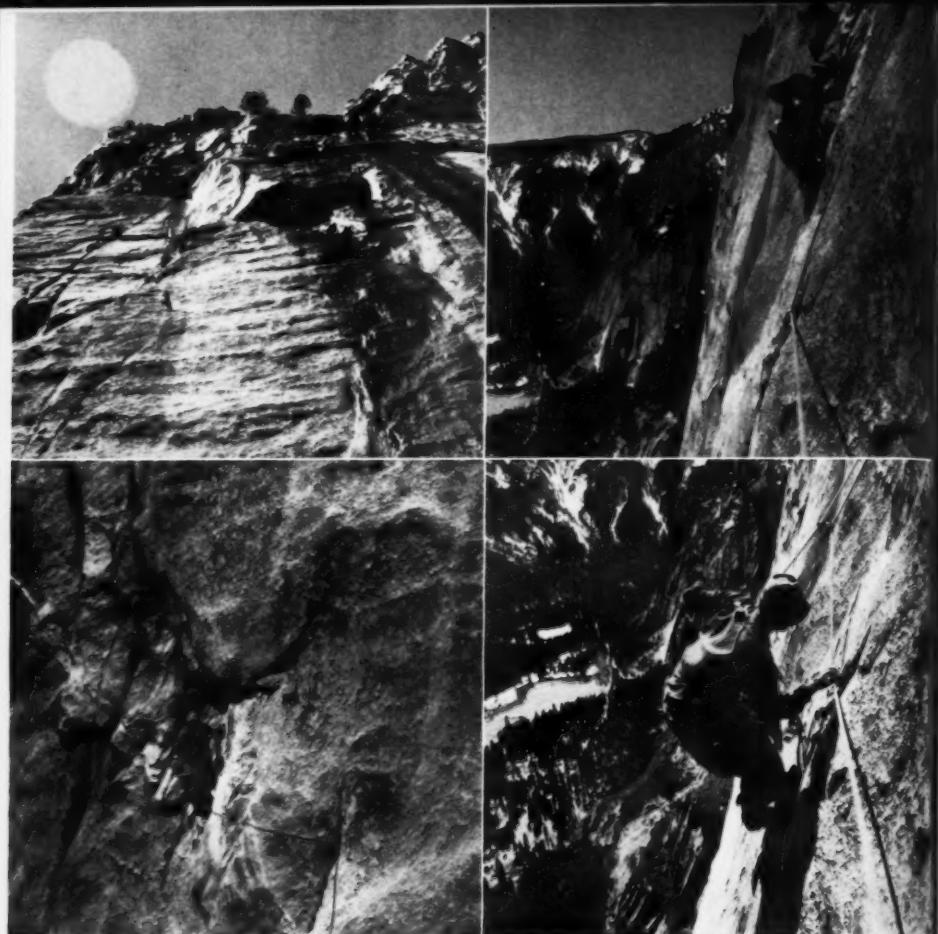
time one day took us to the main ledge, with enough left over for us to reach the previous high point. Returning to the ledge on a double fixed rope, we set up house (on a sandy floor) beneath a large slab. Complete protection from the elements and comfortable sleeping added to the pleasures of the day's efforts.

So complete was the protection that in the morning we awoke to find that it had been raining for some time. So it was going to be tougher. We took the challenge and



EN ROUTE TO THE EL CAPITAN TREE (beneath sharp overhang in upper left corner). Just to the right of the route, and some 2,000 feet above it, El Capitan Fall launches spray and ice in early season. (Below) Tension is in order—and inevitable—on the massive overhang of the first pitch. That the camera has not been tilted is demonstrated as one leader descends on the rope to make way for a substitute. Photos by Robert L. Swift.





ON THE YOSEMITE POINT BUTTRESS. Various scenes near the high point of the second attempt, nearly 3,000 feet above the floor of Yosemite Valley, including a view upward from that high point, showing high-angle avalanche-polished and water-worn granite blocking the remaining step of some 500 feet. Assuming that the upper pitches would challenge climbers for some time to come, the editor had cuts made to show progress as of the year 1952. The climb was completed almost immediately thereafter (see text). Photos by Robert L. Swift.

went up the fixed rope, held by two solid pitons. A piton ladder requiring many angle pitons of assorted sizes brought me to the overhang, which now wasn't quite so apparent. A damp fog displaced the rain—pleasant transition. Above this Bob elected to go left after a short look over to the right. Both directions were good, however, but ours later seemed to be the better. In no time we were sitting on the sandy soil of the Point, nibbling at oranges and plump, sweet fruit drops.

Reaching the top had been adventuresome. In itself, however, the top no longer had importance. The challenge over, we rested, our thoughts peacefully following the wisps of fog as they drifted through the trees.

The Yosemite Point Trail was not overly crowded—it was a foggy, damp, and perhaps a somewhat melancholy day for those who hadn't the feeling for the natural scene, regardless of its moods. Cheerful greetings and casual conversation occasionally interrupted our contemplation of another satisfying trip to the valley as we walked down the trail.

ALLEN P. STECK

The 430-foot Tree

AT THE HEAD of the talus right up beneath the huge overhang on El Capitan, the tree appears deceptively close, though still some 350 feet above. If the entire climb were like the initial lead certainly no one would have dared the attempt. What stirred us to activity, was that certain ledges higher up, possibly large enough to walk on, appeared to lead over to the tree. The problem, then, was to get up to these "Ledges" and see if our hopes were founded in truth and friction.

The first serious attempts began a few summers ago* when two summer rangers climbed a tree at the base of the cliff (to the right of the tree above), stepped onto the rock and started to climb a few piton cracks leading out to the left. These soon gave out into smooth granite and they put in a series of holes, which took a good bit of their spare time. Their expansion bolts were of the retrievable kind and when we arrived on the spot (Dick Irvin, Bob Swift, Jim Wilson, and I) early in March we found the holes difficult to use, and we barely made twenty feet over the two days. Several hours were spent hanging from pitons and bolts in a snow flurry. Those milling around below offered words of counsel while dodging the ice blocks which fell from the rim of the cliff, some 2,000 feet above. We left a fixed rope in our high pitons. Two weeks later Bill Dunmire, Will Siri, Bob Swift, and I returned, immediately after a severe storm. Several feet of snow hindered our ascent of the talus, and even larger falling ice blocks created a chilling "no-man's land" about the base of the cliff. A quick Prusik to the high piton and the leader was off. The rangers' high point was reached and another bolt brought us to a piton crack which led to a roomy ledge. Thus was the first day and a third passed. The lead overhangs throughout its entire 100-foot length. About thirty-five pegs were used, half of them expansion bolts and half pitons. All were used for tension. From the ledge (bolt placed for anchor) the way was still doubtful. Only after this next pitch, which was middling class-5, was it clear that the tree could be reached. Indeed, the class-4 traverse to the final chimney and its ascent (pitons for protection only) were accomplished quickly.

The ledge beneath the tree is quite large and broken. There is some soil. The tree itself is about 80 feet high and quite healthy, but it is not the only one which could be admired for its exposed location. The walls of Yosemite abound with them.

The leads above the tree look interesting. A real opportunity for future rock engineers!

A. P. S.

* The first serious thoughts of making the ascent date back to the 'thirties, when Bestor Robinson thought the first overhang might be passed if a long pole could be tied into several pitons near its base, the pole itself then being used for direct aid. Contemplation of the leverage which would be exerted on those pitons by such a pole served to dissuade more than a theoretical approach. Later on, but still before the war, there were several rainy occasions when climbers assembled at the base of the only likely route in order to make use of what protection from the rain the huge El Capitan overhang could give them. They also experimented with the beginnings of the first pitch, but felt it the better part of valor not to go too far over their heads.—Ed.

Adjectives for Climbers

The climber who would describe the problems entailed in a given climb has long found himself limited by the paucity of adjectives acceptable to the trade—a trade given to such understatement as evinced in the familiar use of the word *interesting*. The adjectives used in the present classification system (as in *A Climber's Guide to the High Sierra*) aren't much more helpful. In the interest of clarity and broad understanding we submit the following as absolute definitions for common climbing adjectives:

EASY—the second party's appraisal of a pitch described as difficult by the party making the first ascent.

MODERATE—ditto for a pitch the first party called severe.

MIDDLING—pertaining to a pitch you'd rather not climb again.

DIFFICULT—obsolete; forced into disuse by second party's penchant for downgrading climb so described.

SEVERE—obsolete for same reason.

INTERESTING—describes a climb one grade higher than you'd care to lead just now.

FASCINATING—one grade higher than you would care to lead ever.

IMPRESSIVE—pertaining to a climb on which expansion bolts are required for direct aid, but cannot be placed.

IMPOSSIBLE—this adjective, along with inaccessible, is long gone into limbo; the 19th-century writer used it to describe climbs subsequently made by girls in their teens, and no one will repeat his mistake.

[The foregoing having been compiled in nostalgia by a survivor from the Golden Age of Tension Climbing.]

D. R. B.

First Ascent in the Canadian Rockies

URING the first two weeks of August, 1951, Chuck and Ellen Wilts, Dale and Frances Ebersbacker, and I made a trip to the area immediately north of Mount Alberta in Jasper National Park. Leaving our car one afternoon on the Banff-Jasper highway, we made a frigid crossing of the Sunwapta River and camped on the moraine of the Diadem Glacier a few miles, but many deadfalls, beyond the road. The next day we traveled the length of the Diadem Glacier, crossed a high col in heavy mists, and dropped to Lynx Creek valley. The following morning we camped at a high lake almost directly beneath the Lynx Creek-Gong Lake divide. So far as we know, this basin and its surrounding peaks had not been previously visited.

Our two primary objectives were the highest peak of the Lynx-Gong divide, and a somewhat lower, but equally spectacular, rock tower about one mile to the west. These peaks are listed by Thorington as 10,500 and 10,150 feet in elevation, although careful interpretation of the map and triangulations made by Chuck and George Harr on a previous trip to the east of this area lead us to believe that they are at least 200 feet higher than that. The following day the weather improved considerably and Chuck, Ellen, and I started out at 7:00 A.M. for the higher peak. We ascended a moraine and some sloping slabs, then traversed steep snowfields to the base of the south face of the mountain, about 1,000 feet below our goal. Here the real climbing began.

The peak itself was a sharp fin with vertical faces on the north and south and narrow ridges running east and west. We chose the east ridge and were discouraged to find it icy and rotten. Chuck led vertically up the face using one piton. Two more leads on class-4 put us on the ridge. Climbing became easier except for the difficulties imposed by a foot of fresh snow. During the early morning we had had beautiful views of Mounts Alberta and Columbia, and most of the Columbia Ice Field, but by noon a storm had moved in and our position began to look dubious. Not only were we faced with the prospect of more snow, but we had reached a 150-foot vertical step in the ridge which seemed unclimbable. After careful consideration, however, we decided to continue if possible. We found that our only alternative was a traverse onto the north face of the mountain. Chuck made one long and very exposed lead on narrow snow-covered ledges. This and the next two leads proved to be the crux of the climb. Following the traverse, the route continued up a rotten open chimney where we encountered several falling rocks. Once past this obstacle we regained the ridge, having used four pitons and considerable time. Fortunately, the remainder of the ascent was low class 4 and occasionally class 3. We reached the summit at 4 P.M. and were favored by a sudden lift of the clouds. After a hasty job of cairn building, picture taking, and a quick snack, we started down, hoping to avoid a bivouac if possible.

With the aid of three rappels over the difficult spots we were able to keep to the ridge for the entire descent. We reached the upper snowfield just at dusk and continued down by flashlight, arriving at our camp at about 10:30 P.M.

The weather showed no signs of improvement, the next two days bringing only rain and snow, so we scrapped plans for an attempt on the rock tower. All five of us were, however, able to make a class-3 ascent of one of the lesser peaks in the area before we departed. We reached the road in one very long and wet day, spurred on by a dangerously large rip which our tent had suffered during packing operations. Ironically enough, the weather had begun to clear the night we reached the road, and we had excellent weather for an ascent of Mount Athabasca before leaving for home.

Unofficially, we have suggested that peak 10,500 be named Mount Smythe in honor of the famous British mountaineer who attempted Mount Alberta during one of his last climbing trips.

GILBERT J. ROBERTS, JR.

Reports and Correspondence Reservoirs and Wilderness

By EVERETT A. PESONEN

Conservation Specialist, U. S. Bureau of Reclamation, Sacramento Office

WATER-CONTROL proposals affecting wilderness are a primary concern of the Sierra Club, and previous issues of the *Sierra Club Bulletin* have devoted considerable space to them. The procedures within the Department of Interior for handling future proposals have also been outlined,¹ as have the recommendations of the President's Water Policy Committee.² The positive wilderness-conservation values of the reservoir which does not encroach upon wilderness, although they have been realized and mentioned elsewhere, have not been covered, and it seems worth while to explore them briefly.

Large dams and reservoirs are major features of the landscape, quite as significant as mountains or natural lakes. They are features which attract people. Travelers include them in their itineraries along with national parks and monuments, and residents of the nearest urban centers seek them for angling, boating, swimming, etc. More than 200,000 people visit Shasta Dam annually, while as many as a million visit Hoover Dam. Millerton Lake, formed by Friant Dam on the San Joaquin River, had 463,000 visitor-days of use in 1951. Admittedly, these are extreme examples, but they serve to indicate the magnitude of dams and reservoirs as sightseeing and recreational attractions. The Central Valley Basin report of the Bureau of Reclamation³ lists forty possible reservoirs which have some recreational potentialities. Four of these—Folsom, Pine Flat, Isabella and Farmington—are already under construction by the Corps of Engineers. Folsom Reservoir offers excellent recreational opportunities; opportunities are fewer, though still considerable, at Isabella and Pine Flat. By adding to the extensive recreational use of existing reservoirs the potentialities of reservoirs proposed and under construction, the Central Valley water conservation program should help to lessen the pressure of a growing population on wilderness—provided, of course, that the recreational potentialities are properly exploited.

Reservoirs, being man-made, are not so limited in the degree or character of development as forest recreation areas or national and state parks. Thus their shorelands may be intensively developed with facilities for a maximum variety of uses. Such development may, in fact, compensate in part for scenic shortcomings, although new scenic values may also be created. Some may think it anomalous to speak of creating scenic values; yet, when one views the towering gray rocks reflected in the McCloud River arm of Shasta Lake or the multihued cliffs along the Colorado in the vivid blue of Lake Mead, how can one discriminate between the inspiring and the merely spectacular?

¹ "Kings River Power: A Test Case," by Bestor Robinson, *SCB*, Sept. 1951. "Excerpts from Address of Secretary of Interior Chapman on November 13, 1951." *SCB*, Dec. 1951.

² "Water Policy: A Conflict of Land Uses," by Richard M. Leonard, *SCB*, June 1951.

³ Senate Document 113, Eighty-first Congress, First Session.

Many reservoirs are large enough to offer seclusion from crowds. Shasta, for example, has 365 miles of shoreline when full, with several campgrounds accessible only by boat. Many who frequent wilderness areas apparently do so more in a spirit of adventure or in search of solitude than in enjoyment of the primeval. The larger reservoirs should appeal to such adventuresome people as well as to those seeking merely a little freedom to roam at large in the out-of-doors. To gain a sense of space and freedom, extensive public ownership of shorelands will be necessary and developed areas will need to be distributed so as to leave some wide open spaces.

Assuming public ownership of sufficient area and proper development of facilities, the forty reservoirs proposed or under construction in the Central Valley will provide opportunity to undertake recreational developments which will divert many people—people who may yet cherish wilderness values as their sensibilities deepen and mature through outdoor experience, even though some of that experience be gained at reservoir areas.*

*As an aid to preserving the back-country wilderness, while recognizing the need which we have for more water, it would seem entirely appropriate to favor the general proposition of storing water at lower levels where scenery is not outstanding, and where no wilderness reserves are encroached upon. We should have to reserve judgment, of course, on each reservoir proposal—particularly as they work upstream toward the reserves and make these more vulnerable by their access roads. I personally favor such dams as Friant, Pine Flat, and Folsom and would like to see them developed in some such way as Mr. Pesonen outlines. They would absorb a lot of use by those who do not seek wilderness for its own sake but for some other benefit, such as managed resources of fish or game.—HAROLD C. BRADLEY, *Chairman, Sierra Club Conservation Committee.*

Reviews

Edited by HARRIET T. PARSONS

THE NATIONAL PARKS: WHAT THEY MEAN TO YOU AND ME. By Freeman Tilden, with an introduction by Newton B. Drury, Director, National Park Service, 1940-1951. Alfred A. Knopf, New York, 1951. 417 pages, 36 photographs, and a map. Price, \$5.00.

In 1951 more than thirty-five million people visited the twenty-eight parks, eighty-three monuments, and other areas administered by the United States National Park Service. But probably only a small percentage of them could give a correct definition of a national park or monument and in what ways they differ from a national forest. For the general public never quite seems to grasp the real purposes of these unique areas, nor understand the ideals and policies of the government service that has charge of them. Yet every American owns a share of the twenty-four million acres of national parks and monuments, and should recognize his responsibilities as a custodian in keeping inviolate these superb examples of undisturbed natural grandeur.

Several years ago publisher Alfred Knopf, a strong believer in the national-park idea, felt that something should be done about this strange ignorance concerning such an important American institution. So he proposed a book which would be "A definitive work on the national parks." Sierran Newton Drury, then Director of the Park Service, suggested that Freeman Tilden was the right man to do the job. Besides being a writer of note, Mr. Tilden had been a consultant in the Park Service since 1940. Mr. Knopf agreed, and *The National Parks: What They Mean to You and Me* is the result. It is a particularly happy one. For the book is no dry-as-dust treatise, but is written with Mr. Tilden's usual liveliness and charm, and, as the subtitle implies, it brings the purposes and significance of the parks directly to the people who own them. Messrs. Knopf, Drury, and Tilden are to be congratulated upon producing a book that was sorely needed.

The story of the national parks is told in three parts. The first four chapters explain why these areas are kept as nearly as possible in a natural state, and their value to the American people as places of enjoyment, inspiration, and education. This section is perhaps the most thorough exposition of the national-park idea ever written. The main body of the book takes up each national park and scenic national monument in turn. But here Mr. Tilden does much more than simply describe the characteristics of the areas. He covers, too, the history, growth and administration of the parks during the past eighty years, as well as the development and activities of the Park Service from its inception in 1916 under dynamic Stephen Tyng Mather to the present day. The Appendices and Index contain a short chapter on the administrative organization of the Park Service; Tabular Information for Tourists on each of the parks and monuments; a Glossary; and a list of areas administered by the Park Service.

Like all Knopf publications, the book is well gotten up and attractively bound. But the illustrations, although adequate, suffer from the severe "bleeding"—in some places to the point of beheading various scenic features.

This is a book to make Americans more fully aware of their unparalleled natural scenic heritage and its increasing value as a haven from the tensions of modern life. It is also a warning that these finest remaining remnants of original wilderness America

are continually threatened by commercial and economic interests. Mr. Drury sounds the keynote for the defense and preservation of our national parks in his introduction: "*... to cherish those crown jewels among the lands of the nation, to keep them unsullied and intact, to conserve them, not for commercial use of their resources but because of their value in ministering to the human mind and spirit ... Surely we are not so poor that we need destroy them, or so rich that we can afford to lose them.*"

WELDON F. HEALD

WATER—OR YOUR LIFE. By Arthur H. Carhart. J. B. Lippincott Company, Philadelphia and New York, 1951. 306 pages, plus index. Price, \$3.50.

Here is a fascinating book, extremely readable, carrying you on through a fund of information, and just as serious as the title implies. The great floods of 1951 and 1952 from Omaha and Kansas City to Manteca and Los Angeles make it seem unnecessary to worry about water "shortages." All too soon many of us have forgotten the recent droughts of 1948 and 1949, when the power companies of California did not even have enough hydroelectric energy to keep the electric clocks running, and New Yorkers drank whiskey to save water. Some of the dust bowls of the great plains are now deeply buried beneath millions of tons of top soil washed from higher watersheds by the floods of the last two years. Actually, it is the excesses of these tragic extremes from drought to flood that point up the urgent necessity for a sound water policy for the United States.

Carhart is a conservation writer of top rank. His facts are sound and he has the ability to express them so clearly that his articles find acceptance in the national publications of the widest possible coverage. Now he has brought together for all to read and enjoy the basic facts and figures with respect to water, gleaned from thousands upon thousands of pages of source material of high authority.

Carhart has magnificent ability to concentrate great issues into a few words. He points out for instance "The National Park System is equal to only about two-thirds of the area we have dedicated to public highways of all types . . . [nevertheless] a scenic area comparable to Yosemite was needlessly debauched by the Hetch Hetchy deal. Hetch Hetchy was a twin scenic wonder to Yosemite. It is within the boundaries of the Yosemite National Park. The scheme was jammed through Congress regardless of scenic values. If there had been no other possible supply for San Francisco, impounding water within a major scenic section of a national park might be justified and condoned. The sad fact is that another, more economical, wholly adequate supply was found." And now in the year 1952 we find the City of Los Angeles attempting to make the same kind of grab of a national park for local use—through applications filed with the State of California to flood the most beautiful areas of the Kings Canyon National Park.

The fight for water is becoming even more desperate than the fight for land or gold. At hearings held by the President's Water Resources Policy Commission in Denver, June 27, 1950, Carhart quotes the Chairman of the Utah Water Users Association as stating "We hope to burn up every drop of water in the Colorado River. We hope to burn up all the water until not a drop reaches the ocean!" In 1950 the Bureau dammed the upper Colorado River just below the boundary of Rocky Mountain National Park. Since the Colorado-Big Thompson project had grown by a great many million dollars over the original estimates to Congress, the Bureau was naturally unwilling to relinquish a single cubic foot of water that would produce dollars.

The Bureau accordingly reduced the average natural flow of the river from 322 cubic feet of water per second to 30 cubic feet per second, of which 27½ cubic feet had to be constantly available by law to meet certain vested irrigation rights. Carhart reports "The Colorado River was no longer a clear, rolling, cool trout stream. It was no longer something to give pleasure in its laughing rapids or quiet pools. It was a sun-baked, stinking little trickle oozing down between heat-seared stream-bed boulders. . . . Protests against this destruction were shrugged off by the Bureau of Reclamation. The fact that seven and a half miles of one of our major rivers was made a biological desert, that another thirteen miles below that was severely damaged, that further damage and destruction to fisheries' values extended miles beyond that, was of no concern to the Bureau of Reclamation pooh-bahs who saw in that water only power and irrigation values. They had miscalculated their water supply by 80,000 acre feet and they clutched on to every gallon to make up for their error. A money-mad private operator might be expected to assume an attitude of arrogant disregard for all other things which his enterprise might demolish as he battered his way toward profits. But in this case of the Colorado River, we have a government bureau, financed by government money—your money—attempting to cloak itself in immunity from being sued because it is 'government' causing this destruction—and against a mandate in the very governmental document which authorized the building of this project in the first place."

It is enough to make one's blood boil to read the official report of the Fish and Wildlife Service, backed up by the dramatic color photographs showing exactly what Carhart has referred to in his book. Charges have been made that the report is inaccurate, and possibly because of that conflict the report was classified "Interior Department—Confidential" for more than a year after it had been completed. Such factual disputes between government agencies can only be judged by outsiders on the basis of general confidence in the respective bureaus involved. Through intervention by the Sierra Club and others, Assistant Secretary Doty released the report in March 1952. It is now on file in the Sierra Club records and available to all who would like to check for themselves.

The citizens of the nation must become aroused and determined that proper action will be taken with respect to our water problems both in flood stage and in drought. It is not sufficient, however, merely to become emotional about these problems. The facts must be known so that intelligent remedies can be demanded. It is far too easy for those seeking money and power simply to plan more dams and higher levees to cure floods, and then to point out in hysteria that water is so essential a part of life that to avoid drought every flat acre, even in our national parks, must be immediately flooded, even though a more careful examination would show alternative sites which could store the entire run-off of a watershed at lower cost and with more efficient utilization of the water. We must have the facts and Carhart's book is one of the finest sources in many years.

RICHARD M. LEONARD

MOUNTAINS WITH A DIFFERENCE. By Geoffrey Winthrop Young. (The New Alpine Library.) Eyre and Spottiswoode. London, 1951. ix + 281 pages. Price, 18s. The name of Geoffrey Winthrop Young will endure as long as mountaineering continues to be a sport, which is likely to be a very long time. Consequently, anything that comes from him is to be highly prized. In America we first became acquainted

with him in 1920 through his *Mountain Craft*. The younger climbers in our country found in it much more of acceptable doctrine than they expected from a veteran of the Alpine Club; they also found points of difference. But, much more important, they found an open mind, a mind that welcomed new ideas. One need only cite the tolerant attitude toward "pegs and aids" as set forth in new editions of the book.

Then, in 1927, came *On High Hills*, with its superb accounts of great climbs. Every aspiring climber who reads these "memories of the Alps" must recognize in their author not only a magnificent athlete but also a sensitive soul. And if the reader has inquired further, he will know of Geoffrey Young's poems, collected in one volume in 1936. And one more thing the reader may know—that after the battle on Monte San Gabriele, in 1917, he lived, but with only one leg.

"Mountains with a difference" indeed! But still "mountains." Young's whole life was bound up with mountains and he was not through yet. This latest book of his carries a note of exultation as it unfolds the rewards of his courage and his laborious, hard, matter-of-fact self-discipline. He returns to the heights—to climb them again. Not half-heights, suitable for the handicapped, but the true ones he had known before—Monte Rosa, the Matterhorn, the Grépon, and others.

These achievements are at the end of the book. There is much besides. There are reminiscences of the early days of climbing in England, Scotland, and Wales. Famous names sparkle upon the pages and send us to the classic volumes of alpine literature with better comprehension of their meaning—Slingsby, Collie, and Mallory, for instance. The events of Monte San Gabriele are duly set forth. And, for an out-of-the-way excursion especially to my liking, there is a delightful account of an ascent of Mount Ida with its far views of ancient Troy and its intimate touches of more recent life along the river Scamander. It is a pleasure to spend hours in the company of such a great mountaineer, at once an athlete and a poet.

FRANCIS P. FARQUHAR

MOUNTAINS OF TARTARY. By Eric Shipton. Hodder and Stoughton, London, 1951. 222 pages, 29 photographs, map. Price, 20s.

For those climbers who find with the passing years that some of the earlier stimulus has gone, this book has special meaning, in that it inspires the urge to activity basic to the sport. Shipton is one mountaineer who is ever keen to express his inner convictions on the meaning of mountains, and as a cure-all for the paralysis common to the armchair mountaineer, he offers these revitalizing words: ". . . to climb a mountain for its height and fame alone is infinitely less rewarding than to attempt a peak whose form has charmed, or to cast a new light upon an attractive mountain range." Thus in mountain exploration Shipton has chosen to renew a deliberate choice.

Who indeed can fail to be stirred by the locale, Sinkiang, perhaps the ancestral home of the horse, perhaps the cradle of mankind, and in any case, the land link between China and Europe during the Middle Ages from which Genghis Khan launched his hordes westward? Sinkiang is a land where the nomadic Kirghiz and Khasak tribesmen rub elbows with the agricultural Turkis and Tungans dwelling in oases in the Tarim Basin bordering the Takla Makan desert. On this seemingly limitless expanse it is not surprising, then, that Shipton finds the stirrup more useful than the climbing boot, the truck more useful than the stirrup; but this is not to say that the climbing boot is eclipsed. Far from it. Nor does the rifle in the quest for ibex and ram chikor ever replace the ice ax.

Opportunity to explore this little-touched mountain paradise came to Shipton during two assignments as British Consul-General in Kashgar. The first stint, 1940-1942, was conducted under adverse political conditions, specifically a boycott, and activity was confined to one escapist tour to the granite spires of Bostan Terek. The second tour, 1946-1948, afforded the green light for freedom of movement, and we may follow the successful search for the elusive Arch, be repulsed on the summit plateau of Muztagh Ata, reconnoiter a route that should go under more favorable circumstances on Bogdo Ola (18,000 feet, an eastern promontory of the Tien Shan), and finally, attempt Chakragil, 22,000 feet. A book, then, for the person who takes delight in exploring new country, or who enjoys these pleasures vicariously, written by a man with an outstanding record in Himalayan mountaineering and exploration.

FRITZ A. LIPPMANN

HIGH ADVENTURE. Text by Norma and Patricia Spring. Photographs by Bob and Ira Spring. Superior Publishing Co., Seattle, 1951. 115 pages, illustrated with 143 photographs. Price, \$8.50.

Mountaineers usually manage to obtain the most compact 35-millimeter camera on the market, but not so for Bob and Ira Spring. With utter disregard for weight these twins carry around twenty-two pounds of Speed Graphic each. This load of course has been rewarding, and the brothers have assembled an outstanding collection of mountain photographs, both technical and scenic. The locale for their *High Adventure* is the upper slopes of the Cascades, where all the pictures were taken.

Not to be outdone are the brothers' wives, who follow along and are often ahead of their picture-taking husbands. With wit and humor they have given their impressions of all that happened in a very delightful fashion. The story relates the progress of the Springs as they ascend one of the larger snowmasses in the Cascades. At appropriate times side issues are brought into the picture.

Although the pictures were taken on many mountains, they follow the general sequence of most ascents. Many tell a story in themselves. Also included in the book is a complete technical record of each picture right down to the number of retakes before perfection was obtained.

RICHARD C. HOUSTON

ARIZONA FLORA. By Thomas H. Kearney, Robert H. Peebles, and collaborators. University of California Press, Berkeley and Los Angeles, 1951. 1032 pages. Illustrated. Price, \$7.50.

Arizona Flora is based on *Flowering Plants and Ferns of Arizona* published by the United States Department of Agriculture in 1942 and out of print for the past several years. Because the demand for a work on the botany of Arizona continued and new data and records pertaining to Arizona plants accumulated, the authors felt that a new work was warranted. Since 1942 there have been added to the known flora of the state one family, 32 genera and 190 species, together with much information pertaining to the distribution of plants throughout the state. This additional data and the new interpretations concerning many Arizona plants contained in recent monographs and revisionary works, which necessitated the rewriting of many of the keys, seemed sufficient reason for regarding the present work as new.

The primary purpose of *Arizona Flora* is to afford a means for identifying the approximately 3,370 species of flowering plants, ferns, and fern allies growing within the state. To facilitate identification, keys to the families, genera, and species are pro-

vided. Brief descriptions are given for each family and genus, and in addition there is also given useful and interesting information pertaining to their economic and ornamental uses, toxic properties and the many ways in which they were (and perhaps still are) used by the different Indian tribes of the state. Under each species is given the distribution within the state (by county), the altitudinal range, time of flowering, and geographic range outside of the state. This material constitutes Part II, the actual Flora and the main body of the work.

The plants of Arizona constitute a diverse lot, for nearly every life form found among North American flowering plants is represented. This diversification has been a result of the topography and past physical history of the area and is discussed in Part I, entitled *The Physical Background and Vegetation of Arizona*. The topics considered under this heading are Topography, Geology and Soils, Climate, Vegetation in Relation to Physical Conditions, and Life Forms.

In addition to Parts I and II there is an introductory chapter on *Botanical Exploration*, and at the end of the book a very useful glossary to the technical terms used and a bibliography to the literature consulted. There are also forty-five well chosen photographs which illustrate various aspects of the vegetation.

The authors had the help of twenty-four collaborators, who contributed treatments of special groups. Dr. Kearney, who is retired from the U. S. Department of Agriculture, is a research associate on the staff of the Botany Department of the California Academy of Sciences, and his share of the work on *Arizona Flora* was done at the Academy. Dr. Peebles has been associated with the Bureau of Plant Industry for the past thirty years, and is at present Senior Agronomist and Superintendent at the U. S. Field Station, Sacaton, Arizona.

The authors, and particularly Dr. Kearney, who was largely responsible for compiling and rewriting the new portions of the work, are to be commended for so scholarly and thorough a work; one which indeed sets a high standard for future regional floras.

ELIZABETH MCCLINTOCK

NATIVE ORCHIDS OF NORTH AMERICA, North of Mexico. By Donovan Stewart Correll. Illustrations by Blanche Ames Ames and Gordon Winston Dillon. Cultural notes by Edgar Theodore Wherry and John Vertrees Watkins. Foreword by Charles Schweinfurth. 400 pages. *Chronica Botanica Co.*, Waltham, Mass., 1950. Price, \$7.50.

This book, written by a botanical specialist on the orchids and illustrated by two of the best botanical artists, may be recommended without hesitation both to the layman and to the professional botanist. In his preface Dr. Correll sets forth his point of view and his aims:

"Much has been written about the orchids of North America, and there are a number of regional treatments of the family, the most important of which are cited in the Bibliography. The present work, however, brings together for the first time information concerning all of the orchids of North America, north of Mexico, and an effort has been made to include the pertinent data regarding them. The species and some of the varieties are illustrated, many for the first time. North America is not only of the varieties are illustrated, many for the first time. . . . an effort has been made to organize and present the material for popular interest as well as for scientific usefulness, without unduly detracting from the value of either."

The reader should not be misled by the author's modest statement that this book must be considered a foundation for future work. That statement is of course true for all such studies, but this book represents a very handsome beginning which sets a high standard for future endeavor.

An introductory chapter discusses the general characters of orchids, the description of the native species and their culture, and explains how to identify them by means of keys to the genera and species. For each species a description is given, comparisons with related species and comments, sometimes an anecdote relating to the species or an experience while hunting for it in the field. A paragraph describes the habitat, the type of place where the plant grows, and the elevations at which it occurs. A second paragraph gives briefly the geographical distribution and a third, cultural notes. Many may wish space had permitted more detailed distributional notes or a map, and the botanist may wish for citation of specimens.

In addition to the 147 plates from pen-and-ink drawings, formalized but delightful drawings of orchids serve as tailpieces at the end of chapters, and demonstrate the care and thought which has entered into the design of the book—a work of art as well as a conservative botanical treatment.

MARY L. BOWERMAN

LET THEM LIVE. By Dorothy P. Lathrop. The Macmillan Co., New York, 1951. 80 pages, illustrated. Price, \$2.00.

Fifty years ago, Ernest Seton-Thompson wrote his *Lives of the Hunted*, with his chief motive and underlying wish ". . . to stop the extermination of harmless wild animals . . . firmly believing that each of our native wild creatures is in itself a precious heritage that we have no right to destroy or put beyond the reach of our children." He dedicated his book "To the Preservation of our Wild Creatures."

Dorothy Lathrop, these fifty years later, in her small but attractive book, carries on the same theme in a different way. Written for children in easy prose, it stresses the need every living thing has for the other, and the plan which keeps nature in balance and gives each creature a place on the earth. "We want to do everything our own way without reference to that great plan into which each living thing fits as a necessary part of this whole world. And we think only of our own gain, forgetting that other creatures have as much right to live here as we have . . . man is taking a greater share of the earth every year, with little thought for the creatures."

The author-artist tells briefly of the birds and animals which have become extinct and those which are threatened with extinction now. A thumbnail sketch of a page or two serves to describe each of the twenty or so animals and birds she has chosen to depict—its appearance, its type of life, and the special dangers which threaten it. The charming black-and-white drawings add distinction and interest to a book which should go far to help young naturalists grow up to be understanding adult conservationists.

H. T. P.

WILDLIFE IN COLOR. By Roger Tory Peterson. Houghton Mifflin Co., Boston, 1951. 192 pages, 453 illustrations in color. Price, \$3.00.

This book was sponsored by the National Wildlife Federation; eighteen artists produced the 453 color plates which were originally issued as Poster Stamps by the Federation. The text was written by Roger Tory Peterson, author of the famous bird guides. The book is divided into twelve sections, each of which is devoted to a type

of habitat—The Deciduous Woodlands, The South, Grass Country, The West. For each the principal trees, flowers, birds, and mammals are illustrated and discussed.

About 170 of the pictures are of birds, 70 of flowers, and 60 each of mammals, fish, and trees; the copperhead is the only snake illustrated. Most of the families of North American birds are included; upland game birds and the duck family are almost completely represented, with a total of 50 species. Most of the prints are excellent likenesses and the colors are generally quite good.

A. LAURENCE CURL

HOW TO KNOW AMERICAN MAMMALS. By Ivan T. Sanderson. Little, Brown and Co., Boston, 1951. 164 pages, illustrated. Price, \$2.50. (Mentor Books, 35¢.)

The author of such widely known nature books as *Caribbean Treasure* and *Animals Nobody Knows* has written this small volume to help the amateur become acquainted with mammals. Avoiding technical language, it describes the general characteristics and habits of every mammalian genus in America north of Mexico. Featured are ten pages of animal tracks, 183 line drawings by the author, and twenty-five color plates by the competent wildlife artist, Louis Agassiz Fuertes.

One misses a theme or purpose to give additional focus and meaning to the separate descriptions. Although written for young people and lovers of the outdoors, the concept of conservation is not effectively introduced. In fact, a short paragraph on the domestic sheep states without qualification that their overall effect on natural pastures is beneficial! The nation's multimillion-dollar fur trade is not mentioned. Separate paragraphs and even figures are devoted to related mammals which the author acknowledges can only be distinguished by specialists.

The book was not written for the professional and he should therefore not be hypercritical of minor errors. It does not matter that the animals are not considered in "check list order," or that the Latin name of the red fox is misspelled. However, the educated layman wants a book which is up to date and basically accurate. The technical names used for a number of animals are considered out of date by most taxonomists. Few readers will care that the arctic fox has larger teeth than the gray fox, but the reverse should not be asserted. Other examples could be cited. But Sanderson has an entertaining style, interesting and informative, and most of the accounts are accurate.

MILTON HILDEBRAND

PUBLIC SCHOOL CAMPING: California's Pilot Project in Outdoor Education.

By James Mitchell Clarke. Stanford University Press, Stanford, 1951. 185 pages. Illustrated. Price, \$3.00.

The idea of school camping is based on the realization that a variety of educational experiences can be had in a camping situation better than in the school or at home. Since there are so many children who will not have that experience in any other way a number of cities have experimented with community camps available to all children. This book is the report of the first five years of the San Diego Camping Program. A joint project of the city and county schools of San Diego, this program makes possible a week of camping for each sixth-grade child as a part of his school curriculum. Besides Camp Cuyamaca, in the mountains near San Diego, the Palomar Mountain Camp for high school and junior high school boys and girls has now been organized. Camp Cuyamaca is open fifty five-day weeks per year. Each week from eighty to a hundred children from the sixth grades of one or more elementary schools

go to camp. The curriculum of Camp Cuyamaca has two main phases. Probably the most important is that concerned with living together. The rest deals with various ways of using the environment, and includes such activities as nature study, crafts, hiking, study of the way of life of the Indians who had lived in that vicinity, and conservation. The children work on such projects as the control of water and conservation of soil, reforestation, fire prevention and the protection of plant and animal life. The book is a useful source of information on methods and means of organizing and administering a public-school camping program. MARY A. CHAMBERLAIN

GEOLOGIC GUIDEBOOK OF THE SAN FRANCISCO BAY COUNTIES. Bulletin 154. State of California, Department of Natural Resources, Division of Mines.

Prepared under direction of Olaf P. Jenkins. 1951. 392 pages, Ill. Price, \$2.50.

This Guidebook, modestly listed as Bulletin 154 of the State Division of Mines, belongs to that uncommon and valuable class of books which combines good descriptive writing with the accuracy of the work of reference. It is really a resource book for everyone who has looked with an observing eye upon the beautiful, complicated area we call the San Francisco Bay Counties.

The volume was prepared under the direction of Olaf P. Jenkins, chief of the Division of Mines, and the names of twenty-eight contributing authors appear on the title page. All are experts in their fields of study, and their articles are profusely illustrated with photographs, sketches, and maps. A section on Historical Background opens the book. Place names, Indian culture, and the Spanish colonization are particularly well covered. Reproductions of the earliest maps and sketches made in this area are of great interest.

The history of the landscape we see around us is then described. Sketches showing the gradual development of the Sierra Nevada, Great Valley, Coast Ranges, and the Bay are clear enough to be understood by the layman approaching Geomorphology for the first time. The chapters on Geology and Mineralogy which follow require some knowledge of geologic terms and sections, though excellent writing and a fairly extensive glossary help the student. A brief correlation of local geology with the earth history of the rest of the North American or European land masses would have been a great help to the nontechnical reader. The larger epochs, Jurassic, Cretaceous, Eocene, etc., are of course indicated, but geologists follow the convenient fashion of naming deposits after the localities in which they occur. To a reader more familiar with (for example) Cambridge Greensand and Purbeck Marbles than Merced Sandstone and Franciscan volcanics, considerable study is indicated to file the local deposits in their proper relation to the rest of the world. Extensive references invite this further study. The sections and surface maps showing the geology of the Bay Counties are extremely valuable and a supplement to the book describes "Routes to travel," pointing out the geology and history seen along several of our favorite local roads.

Fossils and minerals are also well covered and exceedingly well illustrated, and there is a large section of the book called Mineral Industry showing an astonishing variety of local industrial plants using earth products from this area.

This book will be indispensable to anyone who lives around San Francisco Bay and is interested in its story. The authors have succeeded in enlivening the dry bones of science. They present a picture which might be called four-dimensional, for we learn about the surface which spreads around us, the solid earth below, and the story in time of the rocks and the life which evolved upon them. CICELY M. CHRISTY

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SCENIC GUIDES. By Weldon F. Heald; published by H. C. Johnson, Susanville, California. Price, \$1.50 each:

SCENIC GUIDE TO CALIFORNIA, 112 pages, photographs, maps, 1950;
SCENIC GUIDE TO OREGON, 100 pages, photographs, maps, 1951;
SCENIC GUIDE TO NEVADA, 80 pages, photographs, maps, 1952.

These are the latest additions to the handy series of Scenic Guides to the West; Arizona, Utah, and New Mexico are already in print, and Colorado and others (eleven in all) are to be issued later. Weldon F. Heald has compressed such a quantity of geographical, historical, and general current information into the text of each of these three guides that a vacationer can use them to plan any kind of trip, and will find them helpful to have at hand as he travels. Lightweight (paper-bound) and compact, they fit easily in car, pack, or pocket. Emphasis is largely on opportunities for outdoor recreation in every area covered, but there are plenty of facts on cities and towns.

All three books are generously illustrated with photographs and carry many detail maps. The alphabetical arrangement of the text, although at first somewhat surprising, soon proves to be easy to follow; cross references (in bold-face type) are numerous, and the maps help to relate the various portions of the text. There is an index of place names in each guide. The latest book—Nevada—also has color photos and a "Travel-Time" map showing at which seasons it is best to visit the different areas of the state.

V. S.

MOUNT MCKINLEY AND THE ALASKA RANGE IN LITERATURE. A Descriptive Bibliography. By Bradford Washburn. Museum of Science, Boston, 1951. 88 pages, pictorial paper cover. Price, \$2.50.

Bradford Washburn, even before his remarkable climb of the mountain last summer by a new route, was the acknowledged authority on Mount McKinley. He has now been on the summit three times. This extraordinary experience enables him to evaluate the literature of the mountain in a way that could hardly be equaled by anyone else. Lists have been made before in this field, but this one far surpasses them, not only in the addition of titles, especially of articles in newspapers, but also in the descriptions attached to the titles. It is a thoroughly good job of bibliography, and Mr. Washburn will be thanked by generations of mountain climbers to come for the help he has given them.

The advance edition was issued specially for the Alaskan Science Conference held at Mount McKinley National Park in September 1951 and appropriately includes the text of the Act of 1917 which established the park. Also included is Dickey's letter to the New York *Sun*, published January 24, 1897, in which the discovery and naming of the mountain is announced. The bibliography and, we trust, these documents, are to be included in a guide and handbook to Mount McKinley now in preparation by Mr. Washburn. It is eagerly awaited by Mount McKinley enthusiasts, many of whom are aware of his project. Bradford Washburn, by the way, is an honorary life member of the Sierra Club.

FRANCIS P. FARQUHAR

GEOLOGY OF LASSEN'S LANDSCAPE. By Paul E. Schulz. Loomis Museum Association, 1952. 98 pages, illustrated. Price, 55¢.

This is one of a series of booklets about Lassen Volcanic National Park published through the coöperation of the Loomis Museum Association, which is sponsored by the Naturalist Department of the park. Paul E. Schulz, Park Naturalist, states that he wrote the book in response to many requests for Lassen's story as it is presented in the Loomis Museum at Manzanita Lake and to satisfy the need for geological information about the park in a nontechnical form. The need for the book became even greater when Dr. Howel Williams' *Geology of the Lassen Volcanic National Park, California* went out of print in 1950. Those who would know more about the history and scene of this most recent volcanic activity in the continental United States will be able to acquire that information easily and pleasantly through Mr. Schulz's well-illustrated little book—a useful addition to contributions of our park naturalists toward appreciation of our national parks.

B. S.

UNION BAY: The life of a City Marsh. By Harry W. Higman and Earl J. Larrison. Univ. Wash. Press, Seattle, 1951. viii + 315 pp., end-paper map. Price, \$4.00.

It is customary to think of field ecology as a science of the *big out-of-doors*—of forests, mountaintops, isolated shorelines, and distant prairies. Yet some of the best ecological studies have been made in vacant lots, on college campuses, or suburban parks. Union Bay is a notable addition to the literature of backyard ecology. It is an account by two appreciative outdoorsmen of life in the marshlands adjoining the University of Washington campus in Seattle. Behind the football stadium, and partly surrounded by residential areas, the marsh harbors otter, mink, weasel, beaver, and muskrats, as well as a long list of waterfowl, marsh- and shorebirds. The habits and interrelations of these marshland residents are recounted as seen by an observant canoeist who spends his week ends drifting through the channels and backwaters of the bay. The book is light and pleasant reading yet appears to be meticulously accurate in biological detail and interpretation. Handsome sketches by Edmund J. Sawyer add to the interest of the text.

A. STARKER LEOPOLD

MEMOIRS OF A MOUNTAINEER. By F. Spencer Chapman. Chatto and Windus, London, 1951. 446 pages. Photographs and a map. Price, 16s.

This book combines two earlier works of Spencer Chapman—*Helvellyn to Himalaya* and *Lhasa: The Holy City*, published respectively in 1940 and 1946, both out of print for a number of years. In the first part the author tells of his early climbing experiences in the British Isles, the Alps, Greenland, Iceland, and finally in the Himalaya, climaxed by the ascent of Chomolhari with the porter Pasang.

The second part of the book (slightly abbreviated from the original *Lhasa: The Holy City*) is the story of the 1936 British Diplomatic Mission to Tibet, of which he was a member. These chapters are full of descriptions of the people, the country and its history, with some time out for collecting flowers and observing animal life.

It is interesting to read these earlier writings of the author of *The Jungle is Neutral*, and realize how much of his interest in getting along in the wilderness ("this Robinson Crusoe way of living has always fascinated me") was a factor in his survival in his remarkable escape through the Malayan jungle in the last war.

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